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In order to economise in the use of paper, the *Veterinary Bulletin* is now printed in smaller type and with deeper and wider columns. There has been no reduction in the number of abstracts.

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

A list of annotations and reviews, classified according to subject, is now given in *Index Veterinarius*, being inserted at the end of each number. Such papers will not necessarily be dealt with in the *Veterinary Bulletin*.

TECHNICAL REVIEWS

(1) **"Antibacterial Agents derived from Micro-Organisms."**

(2) **"The Present Position of Phenothiazine as an Anthelmintic."**

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THE

VETERINARY BULLETIN

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DISEASES CAUSED BY BACTERIA AND FUNGI

WATTS, P. S. (1942). **The Milking Machine as a Factor in the Incidence of Mastitis as revealed by the Plating Method.**—*Vet. Rec.* **54.** 181–184.

To obtain information on the effect of machine milking on the incidence of mastitis, the rates of infection were studied in 39 herds, of which 27 (group A) were milked by one type of machine, and 12 (group B) by another. The first test, using plating methods, showed that in group A the mean percentage infection was 15·1, while in group B it was 37·3. After about a year of the usual control methods, not in many cases very strictly applied, during which year the herds were examined on the average six times, the mean percentage infection in group A had fallen to 11·7, while in group B it had risen to 42·8. These differences were statistically significant. Those owners in group B who were most careful in applying control measures failed to get the results obtained in group A by owners who did not apply control measures very rigorously.

It was found that for every three cows permanently infected in group A, two cows were only temporarily infected, while in group B there were seven permanently infected for every two temporarily infected.

These results indicate that in any control scheme for contagious mastitis, attention must be paid to the type of milking machine used.—E. COTCHIN.

HUME, C. M. (1941). **Studies on the Detection of Mastitis in New Zealand Dairy Herds. I. A Field Outfit for the Bromthymol Blue Test for Mastitis.**—*N.Z. J. Sci. Tech.* **22.** 322A–327A.

MCDOWALL, F. H. (1941). **Studies on the Detection of Mastitis in New Zealand Dairy Herds. II. Factors Influencing the Bromthymol Blue Test for Mastitis.**—*Ibid.* 328A–337A.

[Authors' summaries copied *verbatim*].

I. During the year 1938–39 a large-scale application of the bromthymol blue test for the detection of mastitis was carried out. The field outfit supplied to the herd Testing Officers is described in detail.

II. All the indicator tests for pH of milk as an index of the presence of mastitis are open to a number of observational errors. The incidence of these errors in the bromthymol blue test has been examined by comparison of the results of the test with direct pH determinations by means of the quinhydrone electrode :–

(1) The volume of foremilk taken is important, as with some quarters there is a rapid fall in the pH of successive streams of milk. The fall in pH is accompanied by a fall in chlorine content.

(2) The time of reading the samples after they are drawn affects the reading. With many samples there was a large rise in pH of the milk during standing for two to five hours. This rise was due partly to loss of carbon dioxide from the milk, and the rate of loss was increased by shaking the sample.

(3) The reading of the test is affected by the fat content of the sample. The higher the fat content the more difficult is the detection of the blue colour registering a positive test. The colour change with phenol red indicator is less sensitive than that with bromthymol blue due to the influence of the yellow colour of the fat. Results submitted show that the fat content of the foremilk may be as low as 0·95 per cent., and as high as 5·7 per cent.

(4) The value of many reports in the literature describing attempts to assess the accuracy of the bromthymol blue and other indicator tests is greatly reduced by the failure of the workers concerned to define the colour standard in terms of pH.

SHATTOCK, P. M. F. (1941). **Field and Laboratory Observations on Mastitis.**—*Proc. Soc. agric. Bact. 1941.* pp. 43–44.

An attempt was made to eradicate *Streptococcus agalactiae* infection from two self-contained herds, by isolation of new purchases, routine hypochlorite disinfection of udders, milkers' hands, and teat cups, and by quarter-sample testing at six-monthly intervals. The disease, however, increased in incidence during the first year of application of control measures, partly due to failure to detect some cases because enrichment methods were not used for culture of *Str. agalactiae.* Later, monthly tests were carried out, and by removing every cow as soon as *Str. agalactiae* was detected in its milk, the disease was brought under control, and two-monthly testing served to keep it so.

S. draws attention to the importance of the presence of staphylococci in the *Str. agalactiae*-free herd.—E. C.

GALLO, P. (1940). Bacteriologia de las mastitis infecciosas en Venezuela. **[Bacteriology of Mastitis in Venezuela].**—*Rev. Med. vet. parasit., Caracas.* **2.** Nos. 3/4. 41–50.

G. studied 59 cases of non-streptococcal bovine mastitis. The causal agent in eight cases belonged to

the *coli-aerogenes* group. Eight cases were due to staphylococcal infection, four to *Corynebacterium pyogenes*, 11 to *Brucella abortus*, and four to tubercle bacilli. The remainder were either mixed infections or cases where the causal agent could not be determined. —MILLER WATSON.

BAUMGÄRTNER, H. (1942). Beitrag zum Vorkommen des Gelben Galtes beim Rind. **[The Incidence of Streptococcal Mastitis (in the Leipzig Area)].**—*Z. Fleisch- u. Milchhyg.* **52.** 122–124.

Since the outbreak of war the position with regard to the incidence of mastitis has deteriorated owing to discontinuation of price control and the shortage of skilled farm labour.

B. refers to a voluntary control system organized by the Leipzig dairies since 1934 at their own expense. By microscopic examination of all incoming milk, the existence of mastitis on the farms was detected, and the farmer was then assisted in identifying the infected animals and urged to give immediate treatment. Before the war, apart from a sharp rise in 1937–38 coincident with an outbreak of foot and mouth disease, the incidence of mastitis as shown by the examination of milk samples was between 0·5 and 1·0%, but since the war this figure has risen steadily.

The need for a post-war campaign is stressed, with systematic bacteriological examination of all milk at the dairy, followed by immediate treatment before the disease has progressed to the point where the normal clinical symptoms can be recognized.

HEIDELBERGER, M., & HENRIKSEN, S. D. (1941). **Proteic Fractions of a Strain of Group A Hemolytic Streptococcus. IV. Azo Dyes Containing Hemolytic Streptococcal Protein.**—*J. Immunol.* **42.** 181–186.

A study was made of the chemical and serological properties of a combination of an azo-dye with a protein fraction of a haemolytic streptococcus. Only a portion of the dye-protein combination reacted in precipitin tests, suggesting that a high proportion of serologically inert material of proteic nature accompanied the actual streptococcal proteic antigens. Although the dye-protein combination did not precipitate an antiserum to a combination between the same dye and egg albumen, an antiserum to the dye-protein contained anti-haptene, since it precipitated dye-egg-albumen and dye-horse-serum-albumen combinations.—E. COTCHIN.

DOMRACHEVA, Z. V. (1940). Novye dannye v etiologii diplokokkovoĭ infektsii telyat. **[Aetiology of Diplococcus Infection in Calves].**—*Sovyet. Vet.* No. 1. pp. 8–12.

Acute, subacute, and chronic diplococcus infection in calves has been observed. The acute stage is characterized by diplococcal sepsis with lesions of the spleen and lymphatic system, and hepatitis and nephritis. Subacute and chronic infections are accompanied by pneumonia. The relationship between the different types of diplococci responsible for the disease in calves and the pneumococcus is discussed. D. was unable to establish any close relationship between such diseases in the calf and the presence in the animal of one or other serological types of diplococcus.—E. R. PARISER.

WOOD, W. B., Jr. (1941). **Studies on the Mechanism of Recovery in Pneumococcal Pneumonia. 1. The Action of Type Specific Antibody upon the Pulmonary Lesion of Experimental Pneumonia.**—*J. exp. Med.* **73.** 201–222.

Fatal pneumonia was produced in white rats by inoculation of the left main bronchus with virulent type 1 pneumococci. The dose used was 0·1 ml. of a diluted six-hour culture containing 4,000–6,000 organisms made up in a 6% mucin-saline mixture. About half the rats died within 48 hours and the rest within five days. The pathogenesis of the resulting pneumonia and pleurisy was studied by killing animals at varying intervals after inoculation. Intravenous injection of a single dose of antipneumococcal serum within 18 hours of inoculation of the culture protected all the animals against the otherwise fatal pneumonia. The antibody caused agglutination and capsular swelling of the pneumococci, especially at the margins of the pneumonic lesions where the organisms were most numerous. The agglutinated bacteria were then attacked by leucocytes and destroyed by phagocytosis. Both horse and rabbit antibody penetrated the lung tissue and immune bodies could be demonstrated in the alveoli within 10 min. of the injection of immune serum.

The main effect of immune serum thus appears to be immobilization of the pneumococci in the advancing zone of oedema. Experiments to be reported later show that sulphapyridine produces the same effect, although by a different mechanism.—E. G. WHITE.

I. GOULD, G. N. (1942). **The Use of Staphylococcal Toxoid in the Field.**—*Vet. Rec.* **54.** 106–107.

II. WILSON, H. M. (1942). **Use of Staphylococcal Toxoid in the Field.**—*Ibid.* 137.

I. G. describes the symptoms of subacute staphylococcal mastitis in lactating cows. The chief features noted were a subcutaneous cording, in the form of a weal, of the tissues upwards from the milk sinus and a weighted lop-sided appearance of the affected quarter, usually a hind quarter. The character of the secretion is also described. G. states that he is able to distinguish mixed streptococcal-staphylococcal udder infections clinically, but points out that the appearances of such cases resemble those of streptococcal mastitis. Treatment of the subacute staphylococcal mastitis with staphylococcus toxoid in doses rising from 10 to 20 ml. given intramuscularly at short intervals was found very beneficial. A combination of toxoid with sulphanilamide and acriflavine therapy for the mixed infections gave equally good results.

II. W. records the successful treatment by toxoid therapy as described by GOULD [see I] of one subclinical and three subacute cases of staphylococcal mastitis.—C. V. WATKINS.

WELD, J. T., & MITCHELL, L. C. (1942). **Agglutination of Rabbit Leucocytes by *Staphylococcus aureus* Toxin.** —*Proc. Soc. exp. Biol., N.Y.* **49.** 370–374.

Agglutination tests were made with 0·2 ml. of graded dilutions of Berkefeld V filtrates of 4–5 day broth cultures of a strongly and a weakly toxigenic strain of staphylococcus, with 0·2 ml. of a rabbit leucocyte suspension containing 20,000 cells per cu. mm. Results were read after shaking up at 15-min. intervals during 1½ hours at 37°C., followed by 30 min. at 4°C. Agglutination clots appeared in tubes containing up to a 1 : 400 dilution of toxin of the strongly toxigenic strain and up to a 1 : 10 dilution of the weakly toxigenic strain. Comparative leucocidin tests, according to the modified bioscopic method of NEISSER & WECHSBERG, using decreased methylene blue reduction as an index of leucocidin activity, demonstrated a definite correlation between leuco-agglutinin and leucocidin content of staphylococcal toxin, both properties being destroyed at the same temperature. Exactly similar results were obtained with bone marrow suspension used instead of leucocyte suspension. The use of the leuco-agglutination test is recommended instead of previous methods for quantitative determination of leucocidin in staphylococcal toxins.—R. O. MUIR.

LAMANNA, C. (1940). **The Taxonomy of the Genus Bacillus. I. Modes of Spore Germination.**—*J. Bact.* **40.** 347–360.

LAMANNA, C. (1940). **The Taxonomy of the Genus Bacillus. II. Differentiation of Small Celled Species by Means of Spore Antigens. III. Differentiation of the Large Celled Species by Means of Spore Antigens.**—*J. infect. Dis.* **67.** 193–204 and 205–212.

I. A slide-culture method is described by which the method of spore formation was studied in 105 cultures of various species of the genus *Bacillus*, classified by their morphological, physiological, and serological (spores as antigen) reactions. Spore germination of a given type was found to be constant for any one culture and species so that clearly defined methods of spore germination were of recognized taxonomic value.

II. Agglutination and agglutinin-absorption tests with spore antisera and vegetative cells of the homologous organisms demonstrated that the spores of the genus *Bacillus* were antigenically distinct from the corresponding vegetative forms. Specific antisera were readily produced in rabbits against spores of the small-celled species of the genus. By a modified agglutination test with a standardized concentrated suspension of spores, which was shaken for $\frac{1}{2}$–$\frac{3}{4}$ of an hour and mixed with dilutions of antiserum at room temperature, three spore serological groups were recognized in four species well defined by spore germination and fermentation tests.

III. Thirty-one of the large-celled strains of the genus *Bacillus*, although differentiable into three physiological groups, were agglutinated by 1 : 200 to 1 : 1,000 dilutions of *B. cereus* spore antiserum. The production of specific spore antisera was not as successful with large-celled as with small-celled strains. The possibility was considered that large-celled strains, possessing a type-specific *B. megatherium* spore antigen, may have a relationship to *B. tumescens*. Eight strains morphologically and culturally identified as *B. mycoides* formed a serologically heterogeneous group.—R. O. M.

SIEVERS, O. (1942). **Investigations into the Antigenic Characters of B. mesentericus and B. subtilis.**—*J. Bact.* **43.** 305–312.

Of the 20 strains of *Bacillus mesentericus* studied, 13 fell into one group, three into a second, and two into a third. One strain did not react at all, and another strain had, besides its own characteristic antigen, a part-antigen in common with a strain belonging to the large group. The *B. subtilis* strains, however, all had one or several common antigens.—E. COTCHIN.

VON BUZA, L. (1940). Untersuchungen über die Virulenz des Milzbrandbazillus. **[Research on Virulence of the Anthrax Bacillus].**—*Zbl. Bakt. I.* (*Orig.*). **146.** 18–24.

From studies of the capsule-forming power and haemolytic activity of strains of *Bacillus anthracis*, the author concludes that three main types of variants occur. The first type is capable of forming capsules and of producing haemolysis under certain conditions of growth (on 15% sheep-blood agar in 5% CO_2); this type is fully virulent. The second type is non-haemolytic, but is capable of forming capsules; this type is rather less virulent. The third type is incapable of forming capsules, and may be either haemolytic or non-haemolytic; this type is of very low virulence.
—E. COTCHIN.

IVÁNOVICS, G., & BRUCKNER, V. (1938). A lépfene immunsavók serologiai analysise mesterséges azoproteinek. segítségével. **[Serological Analysis of Anthrax Immune Serum by Synthetic Azo-Antigens].**—*Mag. orv. Arch.* **39.** 469–479. [Abst. from abst. in *Jber. Vet.-Med.* **64.** 455].

Previous research of the authors indicated that the serologically specific substance of the capsule of the anthrax bacillus was a compound of high molecular weight, of polypeptide character, and built up entirely of *d*-glutamic acid residues. The work was continued to determine whether the serological activity was conditioned by a single *d*-glutamic acid radicle. The *d*-, *l*-, and *dl*- isomers of glutamic acid, *p*-aminobenzoyl-*dl*-aspartic acid, and the *p*-amino-anilides of glutaric acid and adipic acid, were each coupled with horse serum and with human serum in the form of azo-proteins after preliminary diazotizing of their amino groups. The immune serum derived by sensitizing rabbits by intravenous injection of the *d*-glutamic azo-proteins of horse serum also precipitated the corresponding azo-proteins of human serum in high dilutions. The reaction was highly specific. The various azo-proteins were also tested with anthrax serum containing anticapsular antibodies and this was found to precipitate *d*-glutamic azo-proteins of the other analogous radicles mentioned above. The reaction between the *d*-glutamic azo-protein and anticapsular anthrax serum was not reversible, *i.e.* *d*-glutamic immune serum did not precipitate the specific capsular substance of the anthrax capsule.—H. H. GREEN.

*KUJUMGIEFF, I. (1940). **[The Testing of Hides in Bulgaria, in the Control of Anthrax].**—*Clin. vet., Milano.* **63.** 330–337. [Abst. from abst. in *Wien. tierärztl. Mschr.* **28.** 284].

Of nine Government veterinary institutes in Bulgaria one is specially devoted to the examination of hides. One ear from carcasses suspected of anthrax is sent to the institute for examination by Ascoli's test. Preventive vaccination in anthrax areas is on the increase. K. urges the adoption of an internationally uniform method in the examination of hides.—M. L.

MYERS, J. A. (1942). **Bovine Tuberculosis Eradication in the United States and its Resulting Beneficial Effects on Human Health.**—*Proc. 45th Meet. U.S. Live Stk sanit. Ass., 1941.* pp. 14–21. [Also appeared in *J. Amer. vet. med. Ass.* **100.** 12–18].

This article is the report of a medical man's address [see also *V. B.* **11.** 820.] to an audience of veterinarians.

As a result of the practical eradication of TB. in cattle in the U.S.A., M. considers that beneficial effects have resulted in human health, *viz.*, a rapid decline in the incidence of tuberculin reactors among children, and indirectly a reduction in the morbidity and mortality rates of TB. among adults.

M. considers that only brief exposure to an infected person or animal is necessary and regards the idea that prolonged exposure is necessary for infection as obsolete. He suggests that attempts to produce artificial immunity to TB. have failed. The eradication scheme has shown beyond all doubt that the best method of administering tuberculin is by the intradermal route.

[Many of M.'s conclusions will be disputed both by veterinarians and medical men.]—D. L. HUGHES.

MOORE, W. (1942). **A Review of the Animal Tuberculosis Situation in North Carolina at the Present Time.**—*N. Amer. Vet.* **23.** 149.

The campaign for the control of bovine TB. in North Carolina was inaugurated in 1918, and its success is shown by the fact that, during 1941, only four reactors, all in one herd, were found among 35,828 cattle tested. M. states that it would be false economy to suspend the control scheme at present.—E. COTCHIN.

I. MÜSSEMEIER. (1942). Wie ist die Bekämpfung der Rindertuberkulose künftig zu regeln? [**How is Bovine TB. to be Controlled in Germany?**]—*Dtsch. tierärztl. Wschr.* **50.** 43–45.

II. WEISGERBER, F. (1942). Wie können wir in Deutschland die Tuberkulosetilgung durchführen? [**How can Bovine TB. be Eradicated in Germany?**]—*Tierärztl. Rdsch.* **48.** 167–171 and 177–180.

I. M. unfolds a scheme for the control of bovine TB. in Germany. It is apparently an official one for application after the war. Advances in the knowledge of the pathogenesis of TB. have partly explained why the Ostertag method has failed. The new scheme resembles those of other countries depending as it does on early detection of infection by the intradermal tuberculin test and on the building up of clean herds. It is intended to make the scheme compulsory for TB.-free herds and voluntary for infected herds for at least five years, after which it may be made compulsory throughout. As an enticement to co-operation a premium of 2 pfennig a litre is to be given for the milk of TB.-free herds as well as compensation money for tuberculous animals which are slaughtered. An advance over control in most other countries is the forbidding of tuberculous persons to work among clean herds or among the clean sections of a herd in process of "cleaning".

II. W. discusses I, and argues that the proposed scheme is impracticable under conditions which may be expected after the war, because the work involved is so enormous and a vast number of special veterinarians would be necessary. W.'s calculations are based on a TB. incidence rate of about 30% in German cattle. He advocates area eradication, as has been started under the *Rindergesundheitsdienst* [see WINNIGSTEDT, below].—J. E.

*WINNIGSTEDT. (1941). Der Rinder-Gesundheitsdienst im Kampf gegen die Tuberkulose. [**Cattle Health Service Work to Control TB.**]—*Molkereiztg.* pp. 252–253. [Also appeared in *Forschungsdienst.* **11.** 721–722.] [Abst. from abst. in *Jber. Vet.-Med.* **68.** 398].

A progress report on TB. eradication in three dairy districts in the Rhineland. Tuberculin testing (intradermal) and removal or segregation of the reactors together with a premium price for milk from TB.-free herds was the basis of the method used. After two years' work one dairy district was freed from TB., the incidence of TB. in the second was reduced to about 10%, whilst less progress was made in the third district.

*MAGNUSSON, H. (1941). Om förhållanden mellan bovin och human tuberkulos. [**Connexion between Bovine and Human TB.**]—*Svensk VetTidskr.* No. 12, p. 390. [Abst. from abst. in *Skand. VetTidskr.* **32.** 296].

M. states that the bovine type of TB. was introduced into Sweden about 1800, and in the years 1936–39 was responsible for 3·3–8·9% of cases reported in man, farm labourers proving particularly susceptible. The bovine type can be retransmitted from man to cattle, and an instance is reported where, in a herd of 74 cows that had been free from reactors for seven years, 49 reactors suddenly appeared. Infection was traced to a woman milker who had assisted on the farm for a few weeks and was later discovered to be suffering from an open pulmonary TB. of the bovine type.

Cattle are extremely resistant to the human strain, but tuberculous foci are very occasionally formed. Though the avian type is rare in man, it may be transmitted to cattle, but is very seldom transmitted from cattle to man.

BAKER, J. A., & HAGAN, W. A. (1941). **Tuberculosis in Atypical Hosts.**—*Cornell Vet.* **31.** 301–302.

Bovine type tubercle bacilli were isolated from two cases in horses and one in a mink. The possibility that the tuberculous horse may be responsible for the recurrence of TB. in "clean" herds of cattle is stressed. —E. COTCHIN.

*GOIDSENHOVEN, C., & SCHOENAERS, F. (1940). La tuberculose du chat. [**TB. in Cats**].—*Ann. Méd. vét.* **85.** 1–6. [Translation of abst. in *Jber. Vet.-Med.* **69.** 101].

The authors examined culturally 40 cases of TB. in cats and found that 39 were of the bovine type and one of the human type. They also studied the pathogenesis of the cases and found that 24 were enterogenous and seven were aerogenous.

*BENDIXEN, H. C., & JEPSEN, A. (1940). Fortgesetzte Untersuchungen über Corynebacterium equi. [**Continued Researches on** *Corynebact. equi*].—*Z. InfektKr. Haustiere.* **57.** 9–36. [Abst. in *Zbl. Bakt. I. (Ref.).* **139.** 331].

This is a German version of an article published in Danish elsewhere [*V. B.* **11.** 77].—J. E.

BRUNER, D. W., & EDWARDS, P. R. (1941). **Classification of** *Corynebacterium equi.*—*Bull. Ky agric. Exp. Sta.* No. 414. pp. 91–107.

Corynebact. equi strains are comparatively inactive chromogenic diphtheroids, and differentiation from certain other members of the genus is not easily made on morphological and biochemical data alone. Serological tests show that group-, species-, and type-specific antigens are present. Species-specific antigens are demonstrable by complement-fixation tests; type-specific antigens are demonstrable by agglutination or precipitation tests in which acid extracts of the organisms serve as antigens. 29 of the 34 cultures studied belonged to four serologic groups. There were at least 19 types.

Cultures from the genital tract of mares, from aborted equine foetuses, from pneumonia of foals, and from submaxillary lymph nodes of swine belonged to the same serologic group. A culture from an Indian buffalo was shown to be a member of the species, and also to be a member of a group which in addition contained a strain from the os uteri of a mare and a strain from a foal.—E. COTCHIN.

WATANABE, M. (1941). **A Case of Pseudotuberculosis in a Sheep.**—*Jap. J. vet. Sci.* **3.** 23–31. [In Japanese: abst. from German summary].

Lesions in sheep similar to those of pseudotuberculosis are reported, W. stating that the disease has not hitherto been recorded in Japan. The lesions were found in the lungs and the bronchial and mediastinal lymph nodes. In the lung lesions the presence of giant cells was a noteworthy feature. A bacteriological examination was not carried out, but Gram-positive, non-acid-fast bacteria were demonstrated in histological sections of the mediastinal l.nn. —M. LANDAU.

WHITE, E. G., & HENLEY, F. A. (1942). *Erysipelothrix rhusiopathiae* **Associated with Disease in Ducks.**—*Vet. Rec.* **54.** 127–128.

The authors describe the symptoms, lesions, and pathogenicity of a strain of *E. rhusiopathiae* isolated from an outbreak of disease in 54 ducks of which 16 became affected and six died. "Profuse sweating" and lameness with swelling involving one or more foot joints

are spoken of as prominent symptoms. Two doses of *E. rhusiopathiae* antiserum at a 24-hour interval or one dose of 5 ml., given intramuscularly immediately symptoms of illness were seen, then stopped further losses, the lameness subsiding within a month. M & B 693 had some effect in apparently prolonging life in two cases before specific treatment could be adopted.—C. V. WATKINS.

HOFFMAN, H. A., & LENARZ, C. (1942). **A Case of Listeriosis in Chickens and an Additional Case in Sheep.**—*J. Amer. vet. med. Ass.* **100.** 340–342.

An organism of the genus *Listerella* was isolated from a chicken which showed lesions of lymphomatosis. A similar organism was isolated from two sheep. Neither strain in doses of 1·0 ml. intravenously was fatal to chickens.—F. D. ASPLIN.

*ZAHARIJA, I. (1941). **[Antigens for the Glanders Complement-Fixation Test].**—*Vet. Arhiv.* **11.** 65–75. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 101].

It was found that a suitable antigen was most easily prepared by growing cultures in broth and killing the bacilli by heating the cultures to 110°C. when they were 6–8 weeks old. The antigen is composed of the clear fluid left by the sedimentation of the solid constituents.

The risk of laboratory infection is less when fluid media are used for growing glanders bacilli.

FRANCIS, E. (1942). **Fermentation of Sugars by *Bacterium tularense*.**—*J. Bact.* **43.** 343–346.

Classification of cultures by sugar fermentations was found to be impracticable. Of 60 cultures studied, all produced acid but no gas, from glucose, maltose, and mannose, on solid media containing horse serum, cystine, and agar, with bromthymol blue as an indicator. Fifty-three strains fermented glycerol; five of the seven that did not were not of U.S.A. origin. Seventeen strains fermented laevulose; these included the seven strains that did not ferment glycerol. Dextrin was fermented by about half the cultures. None fermented mannitol, galactose, xylose, trehalose, salicin, arabinose, adonitol, sucrose, lactose, amygdalin, dulcitol, erythritol, inositol, inulin, raffinose, sorbitol, or rhamnose.—E. COTCHIN.

*GUARNA, L. (1940). **[Trials of Izar and Famulari's Differentiation Method for Brucella Strains].**—*Clin. vet., Milano.* **63.** 325–329. [Abst. from abst. in *Wien. tierärztl. Mschr.* **28.** 284].

IZAR & FAMULARI [*V. B.* **9.** 300.] attempted to differentiate between the three main species of *Brucella* by their respective reactions to varying concentrations of lactic acid. G. repeated their experiments using rather larger numbers of strains. The results show that this method is of no practical value.—M. LANDAU.

DOMKE, W. (1940). Experimentelle Bruzellose beim Hunde. **[Experimental Brucellosis in Dogs].**—*Z. InfektKr. Haustiere.* **56.** 321–329.

Experiments were conducted on six dogs and two pregnant bitches, all non-reactors to the agglutination test. Three dogs and one bitch were infected *per os* with *Br. abortus* suspension in milk. The rest were inoculated subcutaneously with 5 ml. of a suspension in saline of the same organism.

The four animals infected orally showed an undulating temperature of varying duration and degree. Appetite and general condition remained normal. The most intense reaction was noted in the pregnant bitch. Infection could be demonstrated in all cases by the Meinicke reaction and by the agglutination test. There was a close relationship between the intensity of the temperature reaction and the height of the agglutination titre, and also the result of the Meinicke reaction and the demonstration of the causal organism in infected animals P.M. In the male animals, the Meinicke reaction soon faded out, whereas in the bitch it remained positive throughout the experiment.

The animals infected subcutaneously showed a more rapid rise in temperature, with anorexia and malaise. All became reactors to the two serological tests. A positive Meinicke test and/or an agglutination titre of 1 : 80 or higher proved to be indicative of the presence of *Br. abortus* in any of the infected animals.

The bitch in this series whelped normally and produced living puppies. On autopsy, however, a purulent-necrotic inflammation of the chorion was found. Brucella could be demonstrated in these lesions, while the whey of the bitch was positive to the agglutination test.—M. LANDAU.

STEINHAUS, J. E., & GEORGI, C. E. (1941). **The Effect of Pectin, Galacturonic Acid and Alpha Methyl Galacturonate upon the Growth of Enterobacteriaceae.**—*J. infect. Dis.* **69.** 1–6.

Growth of members of the coli-dysentery-typhoid group of bacteria on beef-extract peptone media, to which were added concentrations of 2–5% pectin and of 0·5–2% galacturonic acid and α-methyl-*d*-galacturonate, was assessed by the criteria of morbidity, and acid and gas production. Pectin at pH levels around 7·0 failed to innibit growth, as also did galacturonic acid under specified experimental conditions, but growth of many dysentery bacteria was inhibited by α-methyl-*d*-galacturonate.

Reference is made to the beneficial effect of the apple diet in human dysentery and similar diseases, reported by other investigators, it being suggested that this is possibly due to the lowering of the pH in the intestinal tract and to the liberation of free α-methyl-*d*-galacturonate, resulting from hydrolysis of the pectin naturally occurring in apples.—ALFRED EDEN.

BUENO, R. C. (1940). Identificação do grupo coli-aerogenes em aves. Distribuição e frequencia. **[Bacteria of the *coli-aerogenes* Group in Fowls].**—*Arq. Inst. biol., S. Paulo.* **11.** 69–81. [English summary].

B. studied organisms of the group from 216 birds, mostly fowls. The bacteria were isolated from the mouth, liver, duodenum, and rectum and classified on the basis of Parr's IMVIC test.

Eight of the sixteen types of Parr's scheme were isolated. Bacteria of the *coli* group were commonest (54·9% in the mouth, 86·5% in the liver, 87·2% in the duodenum, and 91·7% in the rectum). Intermediate types (+++−: ++−−+: −+−−+: ++++: −+++) were next in frequency (10·2% in the liver, 36·5% in the mouth, 12·8% in the duodenum, and 8·3% in the rectum). The *aerogenes* group was only found in the mouth and liver.

[The IMVIC test consists of four reactions, the production of indole from tryptophane, the methyl red reaction, the Voges-Proskauer reaction, and the utilization of citrate. The result is represented as a formula, *e.g.* ++−− for typical *Bact. coli*—see *Amer. J. Hyg.* **27.** 67. (1938)].—MILLER WATSON.

ARMSTRONG, W. H. (1942). **Occurrence of Salmonella typhimurium Infection in Muskrats.**—*Cornell Vet.* **32.** 87–89.

Deaths of American muskrats (*Ondatra zibethica*), due to *S. typhi-murium* infection, occurred in a few adjoining pens on a fur-animal field station. The infection was probably introduced by wild mice. Epizootics of infection due to this organism may

possibly account for deaths of wild muskrats in certain "short" trapping seasons.—E. COTCHIN.

ARCHER, G. T. L. (1941). **Further Observations on Salmonella Flagellar Antigens.**—*J. R. Army med. Cps.* **77.** 188–197.

Further evidence is presented to suggest the view that, in certain diphasic salmonella organisms, simple flagella exist which contain either group or specific antigens, all flagella on individual organisms being in the same phase; in cultures of diphasic organisms, recessive antigens in the contrary phase persist. [See *V. B.* **9.** 612.]

This suggests to A. the advisability of culturing such diphasic organisms in the presence of group antiserum for the production of inocula to be used for the preparation of a specific serum.

Evidence was obtained for the view that group- and type-specific antigens may occur in the same bacterial cell, such a cell being called a hybrid: it is not suggested that a single flagellum may bear both group and specific antigens. Certain anomalous differences observed in the agglutinability of pairs of organisms in the group, which, although members of different species, have the same antigenic formula, suggest that a third flagellar antigen may be present in these organisms, forming a "core" to an outer covering, more or less complete, of either the normal group or type antigens.—E. COTCHIN.

BAUMANN, R. (1940–41). Zur Bradsotfrage I & II. **[On the Question of Bradsot. I & II].**—*Berl. Münch. tierärztl. Wschr.* November 1st. 525–528, and April 25th. 207–208.

I. A review of the literature shows that the aetiology of German bradsot is still not certain. B. stresses the necessity of further bacteriological investigations, especially of stomach contents; in his view the bacteriological examination of the other viscera promises little result. Much confusion had arisen owing to the rapid P.M. invasion of carcass organs by various anaerobes.

The autopsy findings of numerous described cases of German bradsot are reviewed and these link up to form a general disease picture of oedema, haemorrhages, and general reaction of the lymph nodes. Gas formation is a P.M. feature and is not characteristic of the disease itself. Necrosis of the liver had been described in a number of cases.

With the northern form, though much that was contradictory appeared in the earlier literature, it is suggested that here too was a general picture of oedema and haemorrhages. Swelling of the lymph nodes had not been mentioned, and B. suggests that this feature had probably been overlooked. It appeared possible that the northern disease and the German disease were identical but further research was needed. More information was needed on the frequency of liver necrosis in "meadow braxy" in various districts.

B. suggests that the idea that the disease is an allergic process fits in quite well with the observed symptoms, lesions, and conditions of onset. Failure to reproduce the disease artificially militated against the theory of a purely toxic origin.

B. quotes extensively from the literature, but does not mention the work of GAIGER on braxy, nor that of Australian workers on black disease.]

II. This article answers criticisms raised against I. B. considers that the differences between the northern and German forms are not great. He stresses the importance of bacteriological examination of stomach contents.—H. E. HARBOUR.

YAMAGIWA, S., ITO, S., & NIWA, M. (1941). **Studies on Contagious Pleuro-Pneumonia in Cattle. XII. Experimental Infection with Culture of *Asterococcus mycoides*.**—*Jap. J. vet. Sci.* **3.** 1–22. [In Japanese: abst. from English summary]. [For part IX, see *V. B.* **3.** 135. Other parts untraced].

YAMAGIWA, S. (1941). **Studies on Contagious Pleuro-Pneumonia in Cattle. XIII. Histological Investigations on the Experimental Lung-Plague Pneumonia.** —*Ibid.* 109–133. [In Japanese: abst. from English summary].

XII. Details are given of the experiments, reported in 1932 by YAMAGIWA & ITO, in which bovine contagious pleuro-pneumonia was produced by the intratracheal injection of culture of *A. mycoides*. Seventy-one calves and two bulls were used in these experiments. Attenuation of virulence usually occurred during serial passage of the organism. In some cases, however, the virulence was exalted. Intratracheal inoculation of 200–400 ml. of culture caused slight dyspnoea for a short time and the animals showed slight fever. In one group rinderpest complicated the reaction. One animal developed exudative pleuritis. Thirty-seven of 49 cases tested gave a positive complement-fixation reaction from 5–7 days after inoculation and eight were not positive until the tenth day. The reaction then weakened and later disappeared. The organism was found in the blood in only four cases, three of these animals being also affected with rinderpest. Characteristic pneumonia was reproduced in 39 of 64 cases studied.

Subcutaneous inoculation of small doses of culture caused a febrile reaction in only one animal out of 22; five gave a c.-f. reaction 13–17 days after inoculation. In only one case was the organism recovered from the bloodstream; this was from a calf showing a severe local reaction.

Some of the animals were inoculated a second time. Most of them reacted negatively to the c.-f. test. The possible immunizing effect of inoculation with *A. mycoides* culture is not discussed, except that it is stated that a large dose of culture (5 ml.) should be given at the first inoculation to ensure a definite inhibitory effect on local and general reactions at subsequent inoculations.

XIII. The disease was produced experimentally in 28 out of 37 animals by the injection of 200–400 ml. of culture into the trachea through a gum catheter introduced by the nasal route. One of the most characteristic changes was the histological picture of bronchopneumonia. From the macroscopic picture it is presumed that infection reaches the cephalic lobes and then the cardiac lobe and the antero-lateral part of the principal lobes, from which it is aspirated into the smallest branches of the bronchus in every part of the lung. The histological findings varied during the course of the disease. 10–14 days after inoculation, the picture was characterized by bronchopneumonic patches such as occur in catarrhal pneumonia. Most cells showed pyknosis of the nuclei and, together with the surrounding tissues, formed a circumscribed necrotic mass. In a case examined three days after inoculation the pathological changes were less severe. In general the pulmonary reaction (bronchopneumonia) ceased in the early stages of infection and new tissue began to form after about 14 days within and around small foci. In the subpleural and interstitial tissues, inflammatory changes, such as serous exudation, production of granulation and fibrous tissues, and depression due to scar formation, were also observed as the disease progressed. Other changes characteristic of natural cases were also observed, such as lymphangiectasis of

inflamed lymph vessels, and fibrosis of inflamed lymph and blood vessels as well as of the boundaries of parenchymatous and interstitial tissues. The pathological changes were usually rather slight in the interstitial tissue of such cases, where the bronchopneumonia was the main lesion. In eight of the cases of artificial infection the lesions were lobular to lobar in size. One of the characteristic tissue reactions was the proliferation of histiocytic cells in acini surrounding the foci or independently in the parenchymatous tissue, as seen in cases 10–20 days after inoculation.—J. A. G.

GORANOV, Z. (1938). V'rchu aktinomikozata u bivola. [**On Actinomycosis in Buffaloes**].—*Vet. Klin., Sofiya.* **6.** 163–173. [In Bulgarian: abst. from German summary].

Among 1,247 buffaloes slaughtered at the Sofia abattoir, eight were affected with actinomycotic lesions of the head lymph nodes. Microscopic examination of the pus and affected tissues revealed characteristic mulberry-like colonies with club formation. *Staphylococcus albus* and *Corynebacterium pyogenes* were isolated in four cases each from such lesions. In one instance *Staph. aureus* together with some Gram-negative rods were demonstrated, whilst in another a mixed infection with *Staph. aureus* and *Corynebact. pyogenes* was encountered.—M. LANDAU.

SLACK, J. (1942). **The Source of Infection in Actinomycosis.**—*J. Bact.* **43.** 193–209.

S. considers, from his work recorded here, that human actinomycosis arises from endogenous infection from the oral cavity, trauma probably playing an important part. Repeated infection following sensitization may also be concerned in the development of the condition.—E. COTCHIN.

FLÜCKIGER, G. (1942). Aenderungen in der staatlichen Bekämpfung des gelben Galtes der Milchkühe, der Abortus Bang und der Rindertuberkulose. [**Changes in the State Control of Streptococcal Mastitis, Bovine Brucellosis, and TB.**]—*Schweiz. Arch. Tierheilk.* **84.** 89–99.

State-sponsored schemes for the control of bovine mastitis, brucellosis, and TB. on a voluntary basis were introduced in 1934 and 1935. Up to 1942 the schemes had been adopted in 12 cantons for TB. and in 16 cantons for mastitis and brucellosis. The mastitis control plan has met with many practical difficulties and is at present more or less inoperative. A new scheme will not be brought out until after the war.

In December, 1941, the Federal Council issued new instructions for the control of bovine brucellosis on a canton basis with state financial support. The main changes from the previous method are the cessation of compensation payments for removed animals, because such animals are easily and advantageously sold for slaughter, and the application of control on a wider scale instead of its remaining voluntary.

In January, 1942, the Federal Council issued new instructions for the control of bovine TB., which henceforth is to be carried out on an area basis and compulsorily throughout restricted areas chosen by the canton control authorities. For eradication purposes, an affected animal is to mean a tuberculin reactor instead of a case of open TB. as previously.—J. E.

*ROMBOLI, B. (1940). [**Bacterial Flora of the Tonsils of Healthy Sheep**].—*Clin. vet., Milano.* **63.** 285–293. [Abst. from abst. in *Wien. tierärztl. Mschr.* **28.** 284].

The tonsils of 35 healthy sheep were examined P.M. for the presence of bacteria. In addition to a variety of banal organisms, *Corynebacterium pyogenes ovis* was demonstrated. In no instance could members of the *Erysipelothrix* group, or brucella or acid-fast bacteria be isolated.—M. LANDAU.

DISEASES CAUSED BY PROTOZOAN PARASITES

*LAVIER, G. (1940). Altérations cardiaques provoquées chez le boeuf par Trypanosoma congolense. [**Cardiac Alterations in Cattle caused by** *T. congolense*].—*Bull. Soc. Path. exot.* **33.** 393–396. [Translation of abst. in *Zbl. Bakt. I.* (*Ref.*). **141.** 108].

In cattle experimentally infected by *T. congolense*, extensive capillary embolism of the myocardium can be demonstrated. This effect on the heart differs much from that produced by trypanosomes of the *brucei* group, which attack the muscle fibres directly as well as the serous and endothelial membranes, leading to a myocarditis with shrinkage of the organ.

I. KUGOMER, V. (1940). Prilog diagnostici dourine s narocitim obzirom serodiagnostiku i pripremu antigena. [**Diagnosis of Dourine by the Complement-Fixation Test**].—*Jugoslov. vet. Glasn.* **20.** 300–304. [Abst. from German summary].

II. MARKOWICZ, W. (1941). Vergleichende serologische Untersuchungen zur Diagnostik der Beschälseuche. [**Comparison of Sero-Diagnostic Tests for Dourine**].—*Dtsch. tierärztl. Wschr.* **49.** 578–579.

I. K. describes the method of preparing antigen for the c.-f. test for dourine as carried out at the serological institute at Križevci, and discusses the value of this test in the diagnosis of the disease. He states that premises can only be considered free from infection after negative results have been obtained in three tests made at intervals of 3–4 weeks.

II. M. reviews the work on control of dourine in Bulgaria where animals suspected of infection are subjected to serological tests, and animals giving positive results are branded and not allowed to be used for breeding. The disease occurs in Bulgaria in a mild, often symptomless, form, but control measures and systematic breeding management have led to a steady decrease in the number of outbreaks.

The c.-f. test has given very satisfactory results in diagnosis. The antigen used consists of an alcoholic extract of *Trypanosoma equiperdum*, the trypanosomes being obtained by centrifugation from the blood of artificially infected dogs.

In an attempt to find a cheap and rapid test which could be used as a preliminary method of diagnosis, the formol-gel and flocculation tests were investigated but did not give reliable results, whilst the conglutination test, though it gave relatively clear-cut positive and negative readings, failed to detect the low-titre reactions revealed by complement fixation.—U. F. RICHARDSON.

*AJELLO, P. (1940). [**Serological Diagnosis of Canine Leishmaniasis**].—*Clin. vet., Milano.* **63.** 248–258. [Abst. from abst. in *Wien. tierärztl. Mschr.* **28.** 283].

From experiments conducted on 24 affected and 116 control dogs, A. concludes that serological tests using formol, "ureastibamin", or ferropeptonate are not specific for this disease. None the less, the two first tests can be usefully employed as aids to diagnosis in doubtful cases; the ferropeptonate test is less suitable for this purpose.—M. LANDAU.

DRENOWSKY, A. K. (1941). Bemerkungen über Hundeleishmaniosis im Distrikt Petritsch. **[Canine Leishmaniasis in the Petrich Region, Bulgaria].**—*Dtsch. tropenmed. Z.* **45.** 690–692.

D. examined 100 dogs by the formol-gel test and had 51 results strongly positive, 30 positive, and only 19 negative.

Attempts to isolate leishmania in culture failed and liver puncture was not carried out. The symptoms of *L. canis* infection in dogs are recapitulated.—J. E.

*BOS, A. (1941). **[Trichomoniasis in Pigeons and its Control].**—*Acta vet. neerl.* **2.** No. 1. Amsterdam : Dekker & Nordemann. [Abst. from abst. in *Wien. tierärztl. Mschr.* **28.** 335].

A comprehensive monograph on the subject. Among the points made by B. are the following. The causal organism can best be grown on liver broth. Clinically healthy pigeons very frequently harbour the parasite. Localization may occur in the mouth, throat, umbilicus, and internal organs, whilst occasionally a blood invasion is found. Therapeutically, repeated painting of affected areas with a 0·5–1% trypaflavine solution is useful for the elimination of the trichomonads from carriers. This method fails, however, in the treatment of clinically affected birds. Prophylaxis is based on the treatment of carriers and the use of clean parent birds for the hatching of eggs.—M. LANDAU.

HEGNER, R., & WEST, E. (1941). **Transmission of Malaria Parasites (Plasmodium cathemerium) from Canaries and Ducks to Fowls, and their Modification.**—*Amer. J. Hyg.* Sect. C. **34.** 40–46.

By blood inoculation a strain of *P. cathemerium* was transferred to chickens from ducks. The patent period in chickens was found to last for at least seven days and the parasites were maintained for at least 14 days during passage through three chickens and one canary. In day-old chicks the number of parasites decreased from the day of inoculation until they were completely absent from the blood. Passage in canaries and ducks lengthened the usual cycle and there were changes in the time of day when segmentation occurred. When chicken cells were invaded by gametocytes there was no visible change in cell size, whereas the cells of canaries and ducks became smaller under the same conditions. Other differences were concerned with the relative sizes and shapes of the micro- and macro-gametocytes and merozoites in different hosts. The authors suggest that these modifications may be governed by the numbers of erythrocytes and the temperatures of the several hosts.—C. HORTON SMITH.

DIKSHIT, B. B. (1941). **Malaria Immunity in the Rhesus Monkey.**—*J. Malar. Inst. India.* **4.** 199–206. [Author's summary copied *verbatim*].

(1) Methods of replacing the blood of a monkey with that of other monkeys are described and were used to study the rôle played by 'cellular' and 'humoral' agencies in immunity in monkey malaria.

(2) When about 80 per cent of the blood of an immune monkey was withdrawn and replaced with normal non-immune blood, the monkey retained its immunity against heavy superinfection.

(3) When the blood of a normal monkey was withdrawn and replaced with 'immune blood', the normal monkey acquired immunity, if a sufficiently high (more than 70 per cent) replacement was effected.

(4) When the blood of an infected monkey was replaced with 'immune blood', the infected monkey got rid of the infection and passed into a stage of chronic infection, if a sufficient amount of blood had been replaced.

(5) The findings mentioned above are discussed, and it has been suggested that cellular agencies play an important and direct part in malarial immunity, whilst humoral agencies probably play an indirect rôle stimulating the cellular mechanism.

*SERGENT, E., DONATIEN, A., PARROT, L., & LESTOQUARD, F. (1940). Sept années de prémunition contre les piroplasmoses (lato sensu) du boeuf. **[Seven Years' Premunition against Bovine Piroplasmosis, Anaplasmosis, and Theileriasis].**—*Ann. Inst. Pasteur.* **65.** 199–203. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 46].

The long-established method of the Pasteur Institute, Algiers, is claimed to have given excellent results in cutting natural losses from about 16% to less than 1%.

SABIN, A. B. (1941). **Toxoplasmic Encephalitis in Children.**—*J. Amer. med. Ass.* **116.** 801.

S. describes two cases of toxoplasmic encephalitis in children, and discusses the present status of *Toxoplasma.*

A half-grown cat kept in the house of one of the children became sick and had frequent convulsive seizures about the time when the child became ill. The child was not bitten or scratched by the cat and nothing was known about the nature of the illness in the cat.

PINKERTON, H., & HENDERSON, R. G. (1941). **Adult Toxoplasmosis. A Previously Unrecognized Disease Entity Simulating the Typhus-Spotted Fever Group.**—*J. Amer. med. Ass.* **116.** 807.

An account of the disease in two human beings, with a general discussion on aetiology, transmission of infection from human cases to g. pigs and mice, epidemiological considerations, and diagnosis. Figures are given showing the microscopic appearances of affected tissues and of the parasites.

The authors state that six instances of the disease in infants have been reported and P., in collaboration with WEINMAN, published the first account of the disease in two human beings in 1940. Patients affected with this disease have had a history either of having found engorged ticks on their bodies, or of having removed ticks from dogs. Both the cases now described were in persons who had visited country areas in Missouri during the summer just prior to illness, and both had such histories of contact with ticks. The species of ticks concerned are not mentioned. Both clinically and pathologically the disease is remarkably similar to Rocky Mountain spotted fever.

ZEMSKOV, M. V. (1940). K materialam po etiologii infektsionnoĭ zheltukhi krupnogo rogatogo skota. **[Data on the Aetiology of Infectious Jaundice in Cattle].**—*Sovyet. Vet.* No. 6. pp. 22–23.

This disease is closely related to the so-called "Dimitrovskaya fever" in man, and is caused by leptospira. From 17 animals in the Voronezh region. Z. isolated two strains of *Leptospira* similar to those associated with "Dimitrovskaya fever" which Z. proposes to name *L. icterohaemoglobinuriae.* The serum of affected and recovered animals agglutinates the Dimitrovskaya leptospira, which is a valuable diagnostic aid. —A. MOLDAWSKY.

*TERSKIKH, V. I. (1940). **[Leptospirolysins and Agglutinins in Swine Serum].**—*J. Microbiol., Moscou.* **8.** 69–70. [In Russian : English summary] [Abst. from abst. in *Jber. Vet.-Med.* **69.** 47].

Farm hands on a large pig farm became affected with leptospiral jaundice. They had bathed in a pond

to which swine had access and it was considered possible that this fact might have been epidemiologically significant. Some of the pigs were therefore examined serologically with positive results. As, however, other swine which had had no access to the pond were also found to have specific antibodies, the original source of infection was considered more probably to be rats, which were numerous all over the farm.

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

GALLO, P., & LORETO, F. DE A. (1940). La simbiosis ultravirus-bacteria. Estudios y consideraciones. **[Symbiosis between Ultraviruses and Bacteria]**.—*Rev. Med. vet. parasit., Caracas.* **2.** Nos. 1/2. 15–24.

While studying secondary invaders from cases of fowl pox, infectious laryngotracheitis and coryza, the authors found that cultures of these organisms reproduced the original disease. Thus a culture of *Bacterium coli*, secondary invader in a case of fowl pox, was found capable of producing fowl pox. Filtrate of the same culture also proved infective. The authors conclude that the virus of fowl pox co-existed with the bacteria in a state of symbiosis.

From their further investigations, the authors conclude that the virus has no predilection for a special class of bacterium, being found in symbiosis with any species of secondary invader. The virus appeared to be much more virulent in the symbiotic condition, but when the virulence of the bacterium became increased there was no increase in the virulence of the virus. On the other hand, in attenuated or old cultures of the bacteria the virus also tended to lose virulence. The virus can exist in symbiosis with either R or S strains of bacteria. It was found possible to prepare antigens from the virus and bacteria in symbiosis.—M. WATSON.

FINDLAY, G. M. (1942). **Durand's Disease: A Virus Infection Transmissible to Animals and Man.**—*Trans. R. Soc. trop. Med. Hyg.* **35.** 303–318.

F. describes a febrile disease of man, which can be transmitted to g. pigs by inoculation of infective blood, urine, or cerebrospinal fluid, causing fever, enlargement of lymph nodes and spleen, and interstitial pneumonia in those animals. Various other animals and birds can be infected, but no symptoms of disease are apparent after intraperitoneal inoculation. Rhesus monkeys, cats, and dogs develop symptoms after intracerebral inoculation.

A very complete description is given of the histopathological changes in infected g. pigs. The physical and immunological characters of the virus are described.
—ISOBEL W. BURTON.

*TOUSSIENG, E., & FOGEDBY, E. (1941). Om Mund- og Klovesygevirustyper og Virusproduktion. **[Foot and Mouth Disease Virus Types and Virus Production]**.—*Maanedsskr. Dyrlaeg.* **52.** 647. [Abst. from abst. in *Skand. VetTidskr.* **31.** 229].

VALLÉE & CARRÉ (1921) differentiated two types of foot and mouth disease viruses, designating them as A and O. The Germans discovered a third type, C, and renamed the French types B and A. In Denmark the French classification is adopted. Foot and mouth disease in Europe is usually of type O, but secondary outbreaks of type A are prone to occur. Type C has little tendency to spread. Intermediary types have been met with. The authors define the cross-immunity as between types. The O and the A types often appear simultaneously and can be separated by inoculation of graded doses into normal and immune g. pigs. Type strains will maintain their virulence if held at –10°C. in equal parts of glycerin and phosphate buffer solution.
—G. B. BROOK.

—. (1941). Norwegische Massnahmen bei Ausbruch der Maul- und Klauenseuche. **[Norwegian Measures for Dealing with an Outbreak of Foot and Mouth Disease]**.—*Berl. Münch. tierärztl. Wschr.* Sept. 12th. 451.

This contribution from the veterinary department office of the Norwegian government describes the mechanism of control, which follows the usual lines. The movement of personnel of infected farms is strictly controlled during the period of segregation which lasts until after the completion of disinfection. Two months afterwards one or two fresh cattle may be permitted to be placed on the farm and if they remain free of F. & M. disease for two weeks, the herd may be made up again to normal strength. [See also *V. B.* **11.** 760].—J. E.

PALLASKE, G. (1941). Bösartige Maul- und Klauenseuche bei Saugferkeln. **[Malignant Foot and Mouth Disease in Unweaned Pigs]**.—*Tierärztl. Rdsch.* **47.** 381–383.

Several litters of pigs on two large pig farms died suddenly. No clinical diagnosis could be made, but after P.M. and histological examination a diagnosis of F. & M. disease was made. There were no mouth or foot lesions of typical form, but the heart, skeletal muscles, and liver showed acute degenerative lesions such as are known to occur in this disease. 3–6 days after the piglet deaths, the disease broke out in typical form among the adult pigs and in local cattle. The piglets were considered to have caught infection from skim milk from a local dairy, it being supposed that the infected milk came from freshly infected but not yet clinically affected cows.

The pathogenesis and pathology of acute F. & M. disease in piglets are discussed and two photomicrographs are given.—J. E.

*KINDIAKOV, V., DORONIN, N., & ZOTOVA, A. (1940). **[Immunization of Guinea Pigs Against Foot and Mouth Disease by a Chloroform Vaccine]**.—*J. Microbiol, Moscou.* **8.** 84–86. [In Russian: French summary]. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 40].

It was found possible to produce a reliable vaccine for g. pigs by subjecting the chloroform vaccine substance [no details in abstract] to a steady temperature of 26°C. The vaccine had not been tested on domestic animals.

VIANELLO, G. (1940). La vaccinazione antiaftosa con il vaccino all'anisolo. **[Immunization against Foot and Mouth Disease by "Anisol" Vaccine]**.—*Azione vet.* **9.** 132–135.

A vaccine was prepared from epithelium from foot and mouth disease vesicles removed 24-36 hours after infection, when the vesicles were at the height of development. The material was minced and macerated in water and filtered through a coarse filter. The turbid liquid was mixed with aluminium hydroxide to adsorb the virus and 0·3% "anisol" added. The vaccine was kept at 32°C. for six days to attenuate the virus.

V. claims for this vaccine that the contaminants in the oral epithelium are destroyed and that the antigenic power of the vaccine is greater because fine filtration is unnecessary.

Large numbers of animals have been vaccinated and immunity is established in 12–18 days. The

duration of immunity has not been definitely ascertained, but V. claims that it is certainly not less than that obtained by the use of the Waldmann vaccine.—M. W.

*Coppi, R. (1940). **[Vaccination against Foot and Mouth Disease in Sondrio Province, Italy, in 1940].**—*Clin. vet., Milano.* **63.** 426–432. [Abst. from abst. in *Wien. tierärztl. Mschr.* **28.** 286].

22,500 cattle were vaccinated against F. & M. disease with "anisol" virus vaccine. The protection afforded was good, no serious breakdown in immunity occurring in any of the herds. On the other hand, of 4,000 cattle immunized with the Riems vaccine, 20% subsequently contracted the disease. C. considers that on the whole protective vaccination had proved a success in Sondrio. He forecasts its use for small ruminants and swine.—M. Landau.

Fraas, & Stump. (1941). Die aktive Schutzimpfung mit MKS.-Vakzine nach Waldmann-Köbe in Württemberg. **[Active Immunization against Foot and Mouth Disease with the Waldmann-Köbe Vaccine in Wurttemberg].**—*Berl. Münch. tierärztl. Wschr.* Nov. 21st. 565–570.

A description of the authors' arrangements for mass vaccination in infected localities in Wurttemberg in May, 1939, at a time when the epizootic was waning, and later, up to April, 1941. During that time vaccination was carried out in 2,452 herds containing 12,000 cattle. Within 14 days of vaccination the disease appeared in 62 of the vaccinated herds, and these were considered to have been infected before vaccination, and at a later interval it appeared in ten of the vaccinated herds. The normal police control regulations were enforced throughout. Abscess formation after inoculation caused trouble in three communities: this was ascribed to the use of chilled vaccine in cold weather.

The vaccination campaign is considered to have been a valuable control measure.—J. E.

*Mahdessian, H. (1941). Atténuation progressive du virus de la peste bovine dans les conditions naturelles. **[Progressive Attenuation of Rinderpest Virus Under Natural Conditions].**—*Ann. Méd. vét.* **85.** 97–107. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 41].

In two separate though epidemiologically connected outbreaks of rinderpest in Belgian Congo, M. observed that the initial outbreak was followed by a secondary one, which was benign and hardly even caused fever. Lesions caused were weak and transient and there was only rarely a death.

Casals, J., & Palacios, R. (1941). **The Complement Fixation Test in the Diagnosis of Virus Infections of the Central Nervous System.**—*J. exp. Med.* **74.** 409–426.

A special study has been made of the anti-complementary factors involved in virus complement-fixation tests using c.n.s. tissue as antigen. The viruses examined were rabies, St. Louis encephalitis, Japanese B encephalitis, lymphocytic choriomeningitis, equine encephalomyelitis, etc. The immune sera were obtained from dogs, rabbits, g. pigs, and mice injected with homologous infected brain suspensions. Antigens prepared by ordinary centrifugation of infected brain often proved highly anti-complementary, but an improvement was effected by spinning in an ultra-centrifuge at 10,000–30,000 r.p.m. for one hour and passing the supernatant through a Seitz filter pad. An alternative method was to dilute the immune sera with distilled water and heat to 56°C. or over for 20 min. (56°C. for the g. pig, 60°C. for the mouse, 60°–65°C. for man, and 65°C. for rabbit and dog).

When this method was used, each serum sample gave good fixation with the homologous virus and no cross-reaction with any other virus in the selected group.—R. E. Glover.

Helms, K. (1941). **Acute Anterior Poliomyelitis and Vitamin B Deficiency.**—*Med. J. Aust.* June 14th. 717–723.

In view of the neutropic nature of the virus of poliomyelitis and of the influence of thiamin upon nervous tissue, H. discusses various aspects of the physiology of thiamin, particularly with regard to the possibility that a deficiency of this vitamin may predispose the nerve cells to attack by the virus. A large number of references are quoted to show the relationship between thiamin deficiency and the incidence of poliomyelitis.—C. R. Austin.

Webster, L. T., & Johnson, M. S. (1941). **Comparative Virulence of St. Louis Encephalitis Virus Cultured with Brain Tissue from Innately Susceptible and Innately Resistant Mice.**—*J. exp. Med.* **74.** 489–494.

The behaviour of St. Louis encephalitis virus in susceptible and resistant mice was studied by using tissue cultures of mouse brain. A comparison was made of the titres of virus in different combinations of tissue culture plus serum mixtures. It was found that a higher titre was given by virus cultured in 10% serum in Tyrode solution plus brain tissue from day-old susceptible mice than from day-old resistant mice. The marked divergence in titre appears to be due to some difference in the brain tissue itself.—D. D. Ogilvie.

Howitt, B. F. (1941). **Development of Neutralizing Antibodies to the Viruses of Equine Encephalomyelitis (Western Strain) and St. Louis Encephalitis in the Blood and Cerebrospinal Fluid of Man and Animals, together with Recovery of the St. Louis Virus from the Blood of Monkeys.**—*J. Immunol.* **42.** 117–131.

By means of mouse-protection experiments, neutralizing antibodies against Western E.E. virus were demonstrated in the c.s.f. of infected human beings and monkeys. Virus was recovered, during the first few days after inoculation, from the blood and cisternal fluid of monkeys infected with Western E.E. virus, and from the blood alone of those infected with St. Louis virus. Antibodies to the Western E.E. virus appeared from two days after the onset of disease in man, and from about the fifth or sixth day after inoculation in monkeys. They appeared later in the c.s.f.—I. W. B.

Hammon, W. McD., Carle, B. N., & Izumi, E. M. (1942). **Infection of Horses with St. Louis Encephalitis Virus, Experimental and Natural.**—*Proc. Soc. exp. Biol., N.Y.* **49.** 335–340.

Of 69 apparently normal horses from widely separated areas in the U.S.A., tested for antibody to the St. Louis encephalitis virus, 49 were found to be positive. Four non-immune animals inoculated with the virus subcutaneously, intranasally, or intracerebrally, showed no clinical signs of disease, but all developed a high antibody titre. In two instances in which suitable tests were made, virus was isolated from the blood, 26, 36, and 48 hours after infection.—Isobel W. Burton.

Morgan, I. M., & Olitsky, P. K. (1941). **Immune Response of Mice to Active Virus and to Formalin-Inactivated Virus of Eastern Equine Encephalomyelitis.**—*J. Immunol.* **42.** 445–454.

Vaccination with formalin-inactivated Eastern E.E. virus, in sufficient dosage, induced as high a degree of

resistance to intracerebral inoculation as did active virus. Resistance, following vaccination, gradually decreased over six months, but could be raised again to a high level by a further injection of antigen. Serum antibody titre increased in direct proportion to cerebral resistance after vaccination.—ISOBEL W. BURTON.

—. (1941). **Encephalomyelitis in 1941.**—*Vet. Med.* **36.** 444.

Incomplete reports show that in affected areas where vaccination was not performed, losses from E.E. were the highest since 1938. All army horses were vaccinated in early June. Up to August no cases of E.E. had occurred. In one county where the vaccine was administered by laymen incorrectly by subcutaneous instead of by intradermal injection, numerous cases of the disease were recorded.—D. D. OGILVIE.

SYVERTON, J. T., & BERRY, G. P. (1941). **Hereditary Transmission of the Western Type of Equine Encephalomyelitis Virus in the Wood Tick,** *Dermacentor andersoni* **Stiles.**—*J. exp. Med.* **73.** 507–530.

Experiments to demonstrate the hereditary transmission of the Western type of E.E. virus in *D. andersoni*, are described, a strain of the virus from South Dakota being used. The ground squirrel, *Citellus richardsonii*, and the g. pig were selected as test animals. It was found that the virus could be carried by the tick for at least two successive generations, and passed from the female through the egg to the larvae. The infected larvae, nymphs, and adults subsequently transmitted infection by feeding on susceptible hosts. The practical significance of the findings is discussed.—D. D. OGILVIE.

FOSTER, A. O., & SHAHAN, M. S. (1942). **Unsuccessful Attempts to Transmit Encephalomyelitis from Horses to Guineapigs by Endoparasites.**—*Proc. helminth. Soc. Wash.* **9.** 20–21.

G. pigs were inoculated intracerebrally and subcutaneously, with material from endoparasites taken from dead or moribund cases of equine encephalomyelitis or were fed living, infective, strongyle larvae, which had been reared for 11 days on manure from acutely ill horses. Adult worms of the species *Strongylus vulgaris*, *S. equinus*, and *S. edentatus*, strongyle larvae, cylicostomes and " bots " were used in the experiment. The material was prepared in such a way as to test for virus on the surface, in the metabolic products and intestines, and in the bodies of the parasites. Altogether 112 g. pigs were used. In no case was encephalomyelitis transmitted to a g. pig.

—ISOBEL W. BURTON.

MCNUTT, S. H. (1942). **Sporadic Bovine Encephalomyelitis.**—*N. Amer. Vet.* **23.** 242–246.

A detailed account is given of " sporadic bovine encephalomyelitis " (" Buss disease "), an acute, infectious disease of cattle first described in 1940 [see *V. B.* **11.** 540]. Cases have now been diagnosed in Iowa, Texas, and Minnesota. The causative agent has not yet been isolated. Microscopic examination of prepared diseased tissues, however, has revealed coccus-like bodies which appear to be living organisms. A study of these bodies continues. In attempts to demonstrate an active filtrable agent, 15 out of 34 filtrates reproduced the disease when injected into cattle. Calves are easily infected by the subcutaneous as well as by the intracranial route. So far, all calves which have been injected have been susceptible, and it is assumed that the disease lacks only a good vector to be a menace to the livestock industry. In diagnosis the occurrence of a non-purulent, serofibrinous peritonitis without adhesions is pathognomonic. No specific treatment has been of value, but all recovered animals appear to be immune to a second attack.—D. D. O.

TRAUB, E. (1941). Aktive Immunisierung gegen die ansteckende Schweinelähme mit Adsorbatimpfstoffen. **[Active Immunization against Porcine Encephalomyelitis by Adsorbate Vaccines].**—*Arch. wiss. prakt. Tierheilk.* **77.** 52–66.

T. was able to immunize young pigs against porcine encephalomyelitis by the subcutaneous injection of adsorbate vaccine prepared from the central nervous system of pigs *in extremis* after artificial infection. The vaccine was prepared similarly to the Riems foot and mouth disease vaccine, *viz*, by the addition of aluminium hydroxide and formalin, adjustment of the pH to the alkaline side, and by storage for two days at 25°C.

No studies on immunity (onset and duration) were carried out, but the work done would serve as a valuable basis for the large-scale production of vaccine, if the disease were to spread so much as to render the existing method of control by slaughter uneconomic.

The paper contains some incidental information on the nature of the experimental disease and on the virus ; it was found that young pigs could only be infected by intracerebral inoculation of virus, death occurring in 10–20 days, in which time posterior paralysis did not develop. A table shows the degree of pathological change observed in the central nervous system after artificial infection. There was no striking distinction : the brain stem and spinal cord were affected more severely than the cerebellum and the cerebellum more than the cerebrum.—J. E.

I. OLITSKY, P. K., & SCHLESINGER, R. W. (1941). **Histopathology of CNS of Mice Infected with Virus of Theiler's Disease (Spontaneous Encephalomyelitis).**—*Proc. Soc. exp. Biol., N.Y.* **47.** 79–83.

II. OLITSKY, P. K., & SCHLESINGER, R. W. (1941). **Virus of Spontaneous Encephalomyelitis Found in Intestines of Normal Wild Gray Mice.**—*Ibid.* 101–103.

I. Sections were made of the brain and spinal cord of over 30 mice artificially infected with mouse poliomyelitis. As in human poliomyelitis, no characteristic changes were found in the olfactory bulbs. The Gasserian and superior cervical ganglia were affected, not only after intranasal, but also after intralingual and intracerebral inoculation. No lesions were found in the sphenopalatine ganglion.

The authors describe the histological changes occurring before and after the onset of paralysis following intracerebral inoculation. These were similar to the changes following peripheral inoculation and natural infection. The types of lesions, their distribution, and time of onset closely resembled those induced by artificial infection with the Lansing strain of human poliomyelitis.

II. Theiler's virus was recovered from the intestines of five out of six apparently normal wild grey mice, caught in an animal house in which almost all the adult experimental albino mice were carriers of the virus. Preliminary tests failed to reveal the presence of the virus in the intestines or brains of wild mice trapped at a distance from the animal house, although these were just as susceptible to intracerebral inoculation as the albinos.—ISOBEL W. BURTON.

BOURDILLON, J. (1941). **Analytical Diffusion of Influenza Virus and Mouse Encephalomyelitis Virus.**—*J. gen. Physiol.* **25.** 263–273.

The diffusion of influenza virus was studied by placing a layer of solvent (water, borate buffer, or normal lung in buffer) above a solution containing the virus and sampling at various heights for 2–5 days. A diffusion

constant was determined by ascertaining the number of mouse infective doses in the sample. The stock suspension was mouse lung with a titre of 10^{-5} to 10^{-6}, or the fluid from infected eggs.

All the experiments revealed the presence of a relatively large particle of about 100 mμ or more, corresponding to the virus body recovered by ultra-filtration or ultracentrifugation, and a fast diffusing fraction which approximately fitted a curve drawn for the theoretical diffusion of particles 6 mμ in diameter. The latter represented only a small percentage of the total and therefore could only be determined by a method of adequate sensitivity. Results with mouse encephalitis virus also suggested an heterogeneous state in which about 10% of the particles possessed a size of about 15 mμ.

It is possible, therefore, that the actual infective elements are aggregates of comparatively small molecules adsorbed on nonspecific colloidal carriers.

—R. E. Glover.

—. (1941). **Rabies Capital Moved.**—*Vet. Med.* **36.** 386.

For years Alabama, Georgia, has been regarded as the centre for rabies in the U.S.A. Now it seems that rabies is more prevalent in the region of Houston, Texas. In 1940, 284 dog cases were diagnosed there by laboratory methods and probably as many more occurred but were not verified.

Beaumont, a neighbouring town where vaccination of dogs is compulsory, has no rabies. At Houston the city animal humane society, which controls the rabies policy, opposes vaccination.—J. E.

Gallo, P. (1940). Cultivo del virus de la rabia paralítica en embrión de pollo. **[Cultivation of the Virus of Paralytic Rabies on Chick Embryos].**—*Rev. Med. vet. parasit., Caracas.* **2.** Nos. 3/4. 23–31.

G. was able to cultivate the virus of paralytic rabies on the chorio-allantoic membrane of chick embryos in only one out of 12 attempts. The virus decreased in virulence by passage through chick embryos and when laboratory animals were inoculated with the attenuated virus the incubation period was increased.—M. W.

Gallo, P. (1940). Ulteriores estudios sobre el virus de la rabia paralítica de Venezuela. **[Recent Studies on the Virus of Paralytic Rabies in Venezuela].**—*Rev. Med. vet. parasit., Caracas.* **2.** Nos. 3/4. 33–35.

G. gave water, contaminated with saliva from an infected animal, to five calves, and one became infected with paralytic rabies.

G. does not consider, however, that infection *per os* is likely in nature, since the virus will not infect when greatly diluted. When the saliva was added to more than 2 or 3 litres of water the calves were not infected. He considers that infection passed *via* the nasal chambers and the pituitary. [No evidence to support this theory.]

He also attempted to transmit the disease by means of ticks from infected animals. In view of the work of Remlinger & Bailly (1939) he waited for two years before deciding that transmission had failed in these experiments.—Miller Watson.

Rozhnov, D. I., & Potapov, G. G. (1940). O diferentsial'noĭ diagnostike bronkhopnevmoniĭ i smeshannykh s nimi form infektsionnoĭ anemii loshadeĭ. **[Differential Diagnosis of Broncho-Pneumonia in Horses and Equine Infectious Anaemia complicated by Broncho-Pneumonia].**—*Sovyet. Vet.* No. 6. pp. 1–10.

In some districts in the U.S.S.R., E.I.A. is often (up to 70%) complicated by streptococcal broncho-pneumonia. There is a detailed description of the main features of both diseases, the most valuable being the well pronounced remissions in the temperature curve and sharp acceleration of the sedimentation rate of the erythrocytes in E.I.A. infection. This serves to indicate whether cases of broncho-pneumonia are concurrently affected with E.I.A.—A. Moldawsky.

*Shur, I. (1940). **[Resistance of Swine Fever Virus in Meat Treated by Acids].**—*J. Microbiol., Moscou. No. 3.* 94–96. [In Russian: German summary]. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 41].

Pieces of meat weighing 1½–2 kg. were taken from a pig (after bleeding) affected with acute swine fever and placed for ten days in 10% acetic acid, which resulted in the meat attaining a pH of 4·8–5·6. Susceptible piglets inoculated with samples of the meat contracted S.F. The pickling of flesh from infected pigs in the above manner does not therefore appear to be feasible, owing to the risk of spreading the virus.

Hirt, G. (1939). A sertéspestis és az Aujeszky-féle betegség ragá'yanyagának röntgenellenállósága. **[Resistance of the Viruses of Swine Fever and Aujeszky's Disease to X-Ray Irradiation].**—*Állatorv. Lapok.* **62.** 251–253.

Bacteria-free filtrates of the lungs of swine which had succumbed to Aujeszky's disease, as well as subcutaneous and submucous tissues and spinal cord of rabbits artificially infected with the disease, were exposed to X-ray irradiation for 2–3 hours. No change in the virulence of the virus was observed. Similar experiments with swine fever virus showed the same resistance.—J. Csonka.

*Tarantino, G. B. (1940). **[Gangrenous Rhinitis in Sheep].**—*Clin. vet., Milano.* **63.** 445–450. [Abst. from abst. in *Wien. tierärztl. Mschr.* **28.** 286].

The disease, stated to be caused by a virus, is not directly contagious but is spread by the mosquito *Stegomyia fasciata*. Recovered sheep remain carriers for over four months. Immunization trials have so far been inconclusive. Hyperimmune serum and attenuated virus have each given fair results.—M. Landau.

Kligler, I. J., & Perek, M. (1942). **Transmission of Virus of Infectious Tracheitis in Chicken by Contaminated Egg Shell.**—*Proc. Soc. exp. Biol., N.Y.* **49.** 357–359.

Seven chicks of 40 hatched from 110 eggs obtained from an infected farm developed tracheitis. Eggs obtained from the same source were disinfected with $KMnO_4$ and $NaHSO_3$, and none of 30 chicks hatched developed the disease during 61 days' observation. Similar results were obtained when the experiments were repeated.

The shells of eggs obtained from an uninfected farm were painted with mucus from the trachea of an infected chick. Of 18 chicks hatched from such eggs, 11 showed symptoms by the tenth day.

The shells of eggs artificially infected were washed with saline at intervals during the incubation period. All chickens inoculated intratracheally with the washings developed tracheitis. No virus could be demonstrated in dead embryos.

The washings of artificially infected egg shells after disinfection with $KMnO_4$ and $NaHSO_3$ were not infective. The disinfection of eggs did not affect hatchability.—F. D. Asplin.

Feller, A. E., Enders, J. F., & Weller, T. H. (1940). **The Prolonged Coexistence of Vaccinia Virus in High Titre and Living Cells in Roller Tube Cultures of Chick Embryonic Tissues.**—*J. exp. Med.* **72.** 367–388.

Vaccinia virus was cultured in roller tubes in which

fragments of chick-embryo tissues infected with virus were implanted in a plasma embryo-extract mixture. The culture was continually exposed to a nutrient liquid by constant rotation in the incubator. The virus in the liquid was titrated at regular intervals : after an early increase it remained at a high level for as long as nine weeks provided that the liquid portion was replaced by fresh fluid from time to time. During this period the cells continued to grow and showed no obvious evidence of damage by the virus unless the latter was present in very high concentration. The presence of living cells was essential for the persistence of the virus.

Subcultures from infected tissues grew satisfactorily and virus was demonstrable during the first three days. For the following 11 days the fluid part was apparently negative, but subsequently virus reappeared and persisted in the liquid portion of the culture. The suggestion is advanced that the virus is not simply preserved, but is being continually produced.

—R. E. GLOVER.

I. SMADEL, J. E., & RIVERS, T. M. (1942). **The LS Antigen of Vaccinia. I. Inhibition of L- and S-Antibodies by Substances in Treated Vaccine Dermal Filtrate.**—*J. exp. Med.* **75.** 151–164.

II. SHEDLOVSKY, T., & SMADEL, J. E. (1942). **The LS Antigen of Vaccinia. II. Isolation of a Single Substance Containing both L- and S-Activity.**—*Ibid.* 165–178.

I. Several experiments have shown that the L-antigen of vaccinia is almost always associated with the S-antigen, and that a pure L-active solution can only be prepared from LS-antigen by enzymatic digestion.

A purified concentrate of LS-antigen, treated with ammonium sulphate so as to obtain the globulin fraction and heated, no longer precipitated with L-antibody but contained a substance which inhibited the flocculation of the latter with unheated L-antigen : this inhibition was serologically specific. The L-inhibitor was closely associated with S-antigen and could not be separated from it.

S-antigen which had been degraded by heat and alkali to a stage where it no longer precipitated with its own antibody, still possessed some combining activity which was shown by an inhibition phenomenon.

Several hypotheses regarding the nature and mode of action of these substances are discussed.

II. Concentrated dermal filtrate was subjected to electrophoresis in an attempt to separate the L- and S-antigens. In unheated filtrates four components with different mobilities were detected. The fastest and the slowest were easily isolated and were found to be serologically inert, but a sharp separation of the two intermediates from one another was not possible. The latter were also obtained free from inert substances by precipitation at pH 4·6 and were then separated from one another by extraction at pH 6·3. In this way a component containing all the L- and S-reacting substances was isolated. It appeared to be a homologous protein with a molecular weight approaching that of serum globulin. After heating, the purified LS-antigen failed to precipitate with L-antibody but showed the inhibition technique [see I, above].—R. E. GLOVER.

FLORMAN, A. L., & ENDERS, J. F. (1942). **The Effect of Homologous Antiserum and Complement on the Multiplication of Vaccinia Virus in Roller-Tube Cultures of Blood-Mononuclear Cells.**—*J. Immunol.* **43.** 159–174.

Phagocytic cells from the circulating blood and vaccinia virus can be cultivated together for long periods by using the roller-tube technique. A study of the virus-cell relationship in these cultures showed that far from being destroyed, the virus actually multiplied in the phagocytic cells. The addition of immune serum to infected cultures for three days led to the disappearance of the virus, but the virus reappeared when treatment with serum was discontinued. The addition of complement did not enhance the action of serum. So-called " neutral serum-virus mixtures " (they were not entirely inactive when inoculated into the chorio-allantois of the hen egg) were added to roller-tube cultures. Antiserum was then added for 2–3 days, but in the majority of cultures the virus reappeared after the addition of antiserum had ceased.

It will be seen that as mononuclear cells move freely in the body, they may be a vehicle by which virus is spread from the portal of entry. This harmful role was assigned to the monocyte by the early workers who preceded METCHNIKOFF and, indeed, it has in more recent times received attention in the case of the typhoid bacillus and of the influenza bacillus. It is also well known that in vaccinia, rinderpest, and typhus the aetiological agent appears to be closely associated with the blood cells. Further, provided that the virus continues to multiply, the division of mononuclear cells would theoretically permit the virus to persist indefinitely. This is the type of phenomenon that occurs in the Rous sarcoma.—JOHN FRANCIS.

MANNINGER, R., CSONTOS, J., & SÁLYI, G. (1939). **A malacok himlő-szerü kiütése. [Pox-Like Exanthema in Piglets].**—*Állatorv. Lapok.* **62.** 109–115.

The authors discuss the relationship of " pox-like exanthema " in piglets which occurs in Hungary to a true pox and give reasons for the belief that it is a separate entity. They have carried out experimental work and found that, while this condition is caused by a filtrable virus morphologically identical with a true mammalian pox virus, and the histological changes are those produced by such a virus, the virus of cow pox does not immunize against it and *vice versa* and that, while rabbits are susceptible to cow pox they are not susceptible to " pox-like exanthema " of piglets.

Infestation with *Haematopinus suis* leads to confluence of pustules and their dissemination over the skin. They found that the " pox-like exanthema " of piglets could be transmitted from pig to pig by *H. suis*.

They emphasize the importance of good hygiene, and especially the control of lice as means of minimizing losses from this piglet disease.—J. CSONKA.

BRANDLY, C. A. (1941). **Propagation of Fowl- and Pigeon-Pox Viruses in Avian Eggs and Use of Egg-Cultivated Viruses for Immunization.**—*Bull. Ill. agric. Exp. Sta.* No. 478. pp. 313–336.

A brief history of the use of the developing chick embryo in disease studies is given. The technique of egg propagation of viruses with particular reference to fowl and pigeon pox is described.

In fowl-pox immunization studies, the administration of fowl-pox virus intravenously following preliminary vaccination with pigeon virus appeared to induce a greater degree of immunity than the cutaneous application of either virus.—F. D. ASPLIN.

*KATIĆ, R. V. (1940). **[*Rickettsia melophagium* and its Occurrence in Yugoslav Sheep and in their Ectoparasites].**—*Vojno-san. Glasnik.* **11.** 523–527. [Translation of abst. in *Jber. Vet.-Med.* **69.** 113].

The blood of ten out of 49 sheep contained *R. melophagium*, five in pure infection and five in company with a trypanosome. Rickettsia were also found in 85 of 234 *Melophagus ovinus*. The parasite is intracellular or may occur on the epithelial cells or be found free in the intestinal contents.

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

DURAN-REYNALS, F. (1940). **A Haemorrhagic Disease Occurring in Chicks Inoculated with Rous and Fuginami Viruses.**—*Yale J. Biol. Med.* **13.** 77–98.

Intravenous injection of extracts of Rous and Fuginami sarcomas into young chickens induced a haemorrhagic condition. The disease manifested itself either with no co-existent neoplastic features or as a combination of haemorrhagic and neoplastic features. In both cases the disease followed either an acute course with death within 12 days or was more protracted. P.M. examination revealed large amounts of blood in the peritoneal cavity. The organs showed numerous darkened haemorrhagic lesions of three types :– (a) circumscribed raised blebs, (b) diffuse flat small petechial spots, and (c) larger extravasations of blood. They were constantly present in the liver and spleen. In the combined form small white nodules were seen alternating with haemorrhagic lesions. In the pullet and adult fowl the disease generally exhibited characters of the combined haemorrhagic and neoplastic form, but occasionally neoplastic lesions only were observed.

The main factors determining the type of disease produced were the age of host and the dose of the virus. Both chicks and susceptible adult fowls may develop metastatic haemorrhagic lesions following the induction of vigorous local tumours.

Serial passage of the Rous agent through chicks of 1–2 days old resulted in 100% incidence of the haemorrhagic disease without gross neoplastic lesions. Adult fowls inoculated intradermally with saline extracts of the spleens of these chickens developed typical sarcomas. Extracts of Mill Hill 2 endothelioma injected intravenously into chicks did not produce haemorrhagic lesions.—F. D. ASPLIN.

BUER, A. W. (1941). Om patogenese og etiologi ved huspattedyrenes leukose. **[Pathogenesis and Aetiology of Mammalian Leucosis].**—*Skand. VetTidskr.* **31.** 212–223. [English summary].

Nine, or 0·38%, of about 2,400 animals dealt with in the course of routine P.M. examinations at the Veterinary College of Norway were affected with leucosis. Amongst the domestic mammals the condition occurs most frequently in cattle and appears in isolated cases throughout the country.

B. urges the use of the term "leucosis" as being more adequate than "leucaemia", as the disease includes cases where there are no leucaemic changes in the blood picture. B. concludes that leucosis is to be considered as a neoplastic process analogous to the growth of tumour cells. This view is confirmed, partly by investigations of the character of the leucosis in relation to the normal characteristics of the haemopoietic tissue, and partly by experiments carried out on animals. Though the aetiology of leucosis is still somewhat obscure, B. emphasizes the role played by disposition, especially hereditary disposition.

BUER, A. W. (1941). Om hønseleukose og hønselammelse. **[Fowl Leucosis and Paralysis in Norway].**—*Norsk VetTidsskr.* p. 477. [Abst. from abst. in *Skand. VetTidskr.* **32.** 210].

Leucosis was found P.M. in 8·7% of fowls in Norway. It is most frequent in winter. All three forms, the lymphatic (70%), the myeloid (15%), and the erythroleucotic (15%), mainly affect the liver and then the spleen and kidneys, but rarely the other organs.

Fowl paralysis is less common (2·5%). P.M. examination of the lumbo-sacral plexus is necessary for accurate diagnosis, and B. recommends it in all P.M. examinations of birds. In 22 out of 59 cases the paralysis was combined with leucosis, and in 25 of the remaining 37 cases the spleen was enlarged. B. therefore concludes that fowl paralysis is a form of leucosis, the latter possibly being caused by several factors, of which some are of an infectious nature. As resistance to leucosis varies with the breed, it is suggested that the more resistant strains of fowl should be encouraged.

I. MONTEIRO CONCEIÇÃO, J. (1939). Um caso de leucemia da iris do cão. **[Leucaemia in a Dog. Lesions of the Iris].**—*Rev. Med. vet., Lisboa.* **34.** 237–241.

II. MONTEIRO CONCEIÇÃO, J. (1939). Investigações sôbre a leucémia do cão. **[Leucaemia in Dogs].**—*Ibid.* 285–298.

I. In the case studied, the lymph nodes in general were much enlarged and the iris appeared thick and undulated. A blood examination revealed pronounced anisocytosis, and poikilocytosis. P.M. examination showed the usual leucaemic changes and in addition a greatly thickened iris in which there was considerable leucocytic infiltration.

II. The author studied cases of leucaemia in dogs and made detailed blood examinations as well as P.M. examinations. The blood pictures were the usual ones found in leucaemia.

Using blood from affected animals, he attempted artificial infection of healthy dogs. In the two cases reported inoculation was followed by a decrease in erythrocytes and an increase in leucocytes. Over a period of three months the blood picture of one of the dogs oscillated considerably, although an increase of leucocytes always accompanied a decrease in erythrocytes. The blood changes gradually decreased until the animal showed no signs of leucaemia.

The author does not complete his report in this article.—MILLER WATSON.

BERNHEIM, F., BERNHEIM, M. L. C., TAYLOR, A. R., BEARD, D., SHARP, D. G., & BEARD, J. W. (1942). **A Factor in Domestic Rabbit Papilloma Tissue Hydrolyzing the Papilloma Virus Protein.**—*Science.* **95.** 230–231.

The virus of infectious papillomatosis is seldom demonstrable in domestic rabbit growths, and sometimes even a specific antigen cannot be demonstrated in the tumours of domestic rabbits, whereas large amounts of virus are usually present in the papillomas of cottontail rabbits. These facts have been explained [see KIDD —*V. B.* **12.** 415.] by assuming that in domestic rabbit papillomas the virus is neutralized by antibody which has entered from the circulating blood.

The present workers have described experiments suggesting that in domestic rabbits the papilloma virus protein is hydrolysed, presumably by an enzyme which is absent from the wart tissue of the cottontail rabbit. There is no reason why the resultant degraded virus protein should not give the antigenic effect usually observed. Similar factors may explain why virus cannot be obtained from carcinomas derived from papillomas of cottontail rabbits and from other malignant growths. —JOHN FRANCIS.

CAMPBELL, J. G. (1942). **Myelocytoma in the Domestic Fowl.**—*Vet. J.* **98.** 42–45.

A detailed description is given, illustrated by photomicrographs, of a case of myelocytoma in a hen. The primary malignant growth probably arose in the

sternal marrow and there were secondary deposits in internal organs, *viz*, heart, liver, lung, kidney, thymus, and spleen. The cell type appeared to be intermediate between myeloblast and myelocyte.

Two further cases of myelocytoma, and possibly also a third, were encountered in the course of over 1,000 autopsies carried out during the past 2½ years, but a detailed histological study was not carried out.
—E. G. WHITE.

RATCLIFFE, H. L. (1940). **Familial Occurrence of Renal Carcinoma in Rhesus Monkeys (Macaca mulatta).**—*Amer. J. Path.* **16.** 619–624.

The incidence of neoplasms among subhuman primates examined P.M. at the zoological garden in Philadelphia is lower than in any other comparable group of mammals; only 15 cases of neoplasia were found at autopsy of 950 animals. Among a small family group of rhesus monkeys (Macaca mulatta), consisting of the parents (two females and one male) and 14 offspring, four animals showed carcinoma of the kidney. The neoplasms affected the left kidney of the male parent and of three of the offspring. All showed a similar histological structure, although three of them were localized whereas the fourth had given rise to metastases in the right kidney, various lymph nodes, and on the surface of the diaphragm. Most of the animals died at an early age or were sold and the true incidence of neoplasia cannot be determined, but the evidence suggests that the affected male parent carried a dominant factor for renal carcinoma. Such examples may be of value in the study of inherited predisposition to tumour development in man.—E. G. WHITE.

GYÖRGY, P., POLING, E. C., & GOLDBLATT, H. (1941). **Necrosis, Cirrhosis and Cancer of Liver in Rats Fed a Diet Containing Dimethylaminoazobenzene.**—*Proc. Soc. exp. Biol., N.Y.* **47.** 41–44.

Experiments in rats were carried out to find whether liver changes following the oral administration of butter yellow (dimethylaminoazobenzene) were preventable by the addition of casein, or the combined addition of cystine plus choline to the diet. From the observations it was concluded that the lipotropic activity of casein, and especially of the combination of cystine plus choline, gives a definite though irregular protection against the pathological liver change due to dimethylaminoazobenzene.—J. P. GARDNER.

IMMUNITY

*MØLLER, H. E. (1941). En Opgørelse af Resultater fra intrakutane "Omprøver" og "Dobbeltprøver" med bovint og aviaert Tuberkulin. **[The Results of Tests with Bovine and Avian Tuberculin in Cattle].** —*Medlemsbl. danske Dyrlaegeforen.* p. 181. [Abst. from abst. in *Skand. VetTidskr.* **31.** 230 and 234].

M. describes the results of supplementary retests with bovine and avian tuberculins on cattle, which had been considered on a basis of previous tests to be free from TB., but which later reacted doubtfully to bovine tuberculin. A test was regarded as "doubtful" if the increase in skin measurements was at least 2 mm. or 1·5 mm. after the injection of avian and bovine tuberculins respectively.

The results are classified in three groups. Group 1 comprised 414 animals which had given "doubtful" reactions (as above). When a comparative test was applied, 357 (86%) reacted to avian tuberculin, 23 (5·5%) reacted to bovine tuberculin, and 34 (8·5%) again gave "doubtful" reactions. Group 2 included 77 animals regarded as free from bovine TB. (*i.e.* controls); all were negative to the comparative test. Group 3 comprised an additional group of 23 cattle which reacted doubtfully to bovine tuberculin. When the comparative test was made, 14 (60%) reacted to avian tuberculin, 7 (30%) reacted to bovine tuberculin, and 2 (10%) showed "doubtful" reactions.—G. B. B.

GLOVER, R. E. (1941). **The Standardisation of Johnin. I. The Suitability of the Guinea-Pig as a Test Animal. II. Purification of Johnin and its Comparison with an Unpurified Product.**—*Vet. J.* **97.** 3–15 and 179–193.

I. G. pigs injected intraperitoneally with cultures of Johne's bacillus suspended in liquid paraffin became skin sensitive to heat-concentrated synthetic-medium johnin. Selection of g. pigs weighing at least 400 g. was essential to obtain maximum sensitivity, which reached its peak at about the eighth week after injection. The intensity of the reactions was proportional to the strength of the johnin and it was found possible to detect a 50% variation in potency of different johnins by g. pig titration along the lines adopted by OKELL & PARISH (1927) for tuberculin. The values of four different samples of johnin as revealed by g. pig test were correlated with the results obtained on a few allergic cattle. Johnins which gave good reactions in g. pigs were also satisfactory when applied to infected bovine subjects.

II. Purified protein derivatives were obtained from cultures of Johne's bacillus in synthetic medium, by ultrafiltration followed by precipitation with trichloracetic acid, or by adsorption on benzoic acid, or by saturation with ammonium sulphate. The yield ranged from 10–22 mg. per 100 ml. of culture medium.

The maximum amount of johnin P.P.D. which could be injected intradermally into normal g. pigs without producing a reaction was 1 mg., *i.e.* 0·2 ml. at a concentration of 5 mg. per ml., although twice this concentration only produced a transient roseate reaction. G. pigs sensitized by intraperitoneal inoculation with Johne's bacillus in liquid paraffin reacted in amounts ranging from 0·0001 to 0·00007 mg. Assay of a sample of heat-concentrated synthetic medium johnin showed a skin reaction equivalent to that produced by about 0·003 mg. per ml. of johnin P.P.D. In cattle known to be free from Johne's disease, clear-cut negative reactions were shown at johnin P.P.D. concentrations up to 3 mg. per ml. The same solution evoked oedematous swellings in reacting cattle. A solution of P.P.D. at 5 mg. per ml. buffered with 0·5% $NaHCO_3$, adjusted to pH 7·6 with citric acid, and preserved with 25% glycerol and 1 : 20,000 merthiolate retained its activity unimpaired for 175 days.—H. H. GREEN.

I. KATZ, G., & COHEN, S. (1941). **Experimental Evidence for Histamine Release in Allergy.**—*J. Amer. med. Ass.* **117.** 1782–1783.

II. ROCHA E SILVA, M. (1942). **The Histamine Theory of Anaphylactic Shock with Special Reference to Anaphylaxis in the Rabbit.**—*Arch. Path.* **33.** 387–408.

I. The results of 75 experiments on venous blood from 18 human patients showed that the plasma histamine level rose considerably when blood from an allergic patient was incubated at 37°C. for 15 min. with an extract of allergen; no increase was observed when blood from a non-allergic individual was incubated with allergen. The blood cells were shown to be the source of the increased histamine, as incubation of sensitized

plasma with the allergen did not change the histamine level.

II. A general review is given of experimental work, mainly on the rabbit, showing the similarity between the pharmacologic action of histamine and the reaction occurring during anaphylactic shock. It is pointed out that there is a strong analogy between the Arthus phenomenon and the inflammatory reactions observed after the intradermal injection of irritants, and evidence is given that histamine plays an important role in the earlier stages of this phenomenon. Smooth muscle tone and changes of the cardiac muscle under anaphylactic shock and histamine action are compared, and the resemblance between acute poisoning, such as that produced by some snake or bee venoms, and the anaphylactic crisis is discussed. Much of the work referred to has already been abstracted [see *V. B.* **11.** 461 and 790, and **12.** 31 and 171].—R. Allcroft.

Sabin, F. R. (1941). **Cellular Reactions to Fractions from Tubercle Bacilli.**—*Amer. Rev. Tuberc.* **44.** 415–423.

A short review of work done under the auspices of the Committee on Medical Research of the National Tuberculosis Association, with a bibliography of 28 references.

In general every cellular reaction recognized in the lesions of TB. could be reproduced by fractions chemically isolated from tubercle bacilli, but none of the fractions effected any change in resistance to the disease. Of the lipoid fractions the most interesting from a biological point of view was the phosphatide, because it reproduced the lesion most characteristic of the disease, *i.e.* the tubercle. The phosphatide is phagocytosed by monocytes which, in dealing with it, become epithelioid cells usually arranged in tubercles similar to the hard tubercles of the actual disease, and which in course of time die *en masse*, simulating caseation. The capacity of the phosphatide to induce formation of tubercles was found to be due to phthioic acid.

The wax-like fractions of the organism, to which the property of acid-fastness is due, are also slowly phagocytosed by the pooled surfaces of numerous monocytes and so induce the formation of foreign body giant cells.

The polysaccharide fractions exercise a chemotactic effect on neutrophiles. Through repeated daily injections of tuberculo-polysaccharide a normal blood count was maintained by marrow hyperplasia, suggesting that the products of digestion of extravasated neutrophiles served as stimulus for cell division and maturation in bone marrow.

The specific effect of the protein fractions was an increase in monocytes. When given in solution this was the only effect noted, but when given as insoluble particles, epithelioid cells were also produced in normal animals and tubercles in tuberculous ones.

With regard to sensitization, the power of tuberculo-protein to induce skin sensitization depends upon the molecular weight and is markedly enhanced by the addition of tuberculo-phosphatide. The purified protein derivative of lowest molecular weight, *i.e.* 9,000, is non-antigenic, whereas a fraction of molecular weight 32,000 is highly antigenic. The sensitization induced by protein differs, however, from the allergic condition in the actual disease in certain significant ways, and it is concluded that such induced sensitization is only one phase of the reactions set up by infection and is no part of the changes expressed in altered resistance.

With regard to antibody formation, it is concluded that the cells of the reticulo-endothelial system are involved in the production of both normal and immunologically active globulin, and that both cellular and immunological reactions in TB. centre around the functions of the monocyte.—H. H. Green.

Smetana, H., & Shemin, D. **Studies on Photo-Oxidation of Antigen and Antibodies.**—*J. exp. Med.* **73.** 223–242.

Serological, chemical, and physico-chemical analyses were made of the changes occurring in recrystallized egg albumin, anti-egg-albumin rabbit serum, antipneumococcus type I horse serum, fractions of these antisera and recrystallized haematoporphyrin-hydrochloride, during progressive photo-oxidation which was measured by means of Fenn's respirometer. Quantitative precipitin studies demonstrated that photo-oxidation progressively reduced the antigenic function of egg albumin and the potency of anti-egg-albumin rabbit serum and antipneumococcus type I horse serum, as well as of their specific antibody fractions, and destroyed the anaphylactic properties of egg albumin in g. pigs and its precipitinogenic power in rabbits. Chemical studies are described of the effect of photo-oxidation on certain amino acids in egg albumin and in specific protein fractions of the previously mentioned antisera. A marked alteration in the pattern of egg-albumin, antisera and their specific antibody fractions, due to photo-oxidation, was demonstrated by electrophoretic studies. The migration of haematoporphyrin and eosin in these unaltered and photo-oxidized antisera as well as their specific antibody fractions, was also investigated.—R. O. Muir.

von Haam, E., & Rosenfeld, I. (1942). **The Effect of Estrone on Antibody-Production.**—*J. Immunol.* **43.** 109–117.

Thirty adult healthy rabbits were injected intraperitoneally with 1·0 mg. (10,000 I.U.) of oestrone (in the form of theelin) or with a similar dose of sesame oil three times a week, for two weeks before and throughout immunization with formolized type I pneumococcus broth culture. A comparison was made of the agglutinative and mouse-protective titres of the sera of control and test groups. Several of the control and test rabbits were castrated a month before the oestrone injections. Oestrone-injected, castrated, and non-castrated rabbits of both sexes showed a remarkably higher titre of specific agglutinins and protective antibodies than the corresponding control rabbits, and their antibody production was more rapid, reached a higher peak, and disappeared more slowly than in the controls. Re-immunization produced a less remarkable rise in agglutinins in the oestrone-injected rabbits and no increase in the protective antibodies.—R. O. Muir.

Treffers, H. P., Moore, D. H., & Heidelberger, M. (1942). **Quantitative Experiments with Antibodies to a Specific Precipitate. III. Antigenic Properties of Horse Serum Fraction Isolated by Electrophoresis and by Ultracentrifugation.**—*J. exp. Med.* **75.** 135–150. [For previous parts, see *V. B.* **12.** 381].

A continuation of previous studies. Rabbit antisera to type II pneumococcus specific precipitate from horse serum were tested with fractions prepared by ultracentrifugation and electrophoresis of normal and immune horse serum. It was concluded that anti-pneumococcus antibodies from horse sera resemble in antigenic behaviour certain normally occurring horse serum globulins, while they differ in some respects from others having the same sedimentation constant or electrophoretic mobility. Thus the antibodies were practically identical in antigenic properties with a

rapidly sedimenting globulin from one sample of supposedly normal horse serum, but differed in these properties from a sample with the same sedimentation constant from another horse. Difference in antigenic behaviour between the normal and immune γ-globulin of the same electrophoretic mobility was accompanied by differences in sedimentation constants and molecular weights, in accord with quantitative relations among the immune properties, suggesting that the differences were only reflections of the variation in chain length. —JOHN FRANCIS.

EGGERTH, A. H. (1941). **The Effect of Ninhydrin upon Horse-Serum-Protein and Antibodies.**—*J. Immunol.* **42.** 199–218.

A biochemical investigation was made of the effect of ninhydrin (triketohydrindene hydrate, a reagent commonly used for qualitative and quantitative determination of amino groups) upon normal horse serum and upon a type 1 antipneumococcal serum and two samples of antityphoid immune horse sera. The treated serum protein was fractionated by acid precipitation or salting out with neutral salts, the precipitates were dissolved in buffer solution at pH 7·5 and the solutions dialysed until free from colouring matter and ninhydrin excess. The total nitrogen was determined for all significant fractions by the micro-Kjeldahl method of Wong.

Agglutination tests were made with the dissolved precipitates and formolized typhoid H and O and pneumococcus suspensions to determine the relation of time of incubation with ninhydrin and pH of serum incubated with ninhydrin to the amount of protein and antibody in the precipitates. A study was also made of the effect of ninhydrin upon the amino-nitrogen in serum globulin and upon the immune globulin fraction and the mouse-protective action of horse antipneumococcal serum. Similarities and differences between the action of ninhydrin and formaldehyde upon serum proteins and antibodies are discussed.—R. O. MUIR.

*PALTRINIERI, S. (1941). Brucellosi e tubercolosi. (Ricerche negli ovini.) [**Brucellosis and TB. (Experiment on a Sheep)**].—*Nuova Vet.* **19.** 80–86. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 105].

Working on the problem of antagonism between infections, P. infected a sheep with brucellosis and later with TB. and observed that the former infection slightly reduced this animal's resistance to TB.

I. EAST, M. E., MADINAVEITIA, J., & TODD, A. R. (1941). **The β-Glucosaminase Activity of Testicular Extracts and its Bearing on the Problem of Diffusing Factors.**—*Biochem. J.* **35.** 872–876.

II. MCCLEAN, D. (1941). **Further Observations on the Capsulation of Streptococci and its Relation to Diffusion Factor (Hyaluronidase).**—*J. Path. Bact.* **53.** 156–158.

III. UNGAR, J., & BACHARACH, A. L. (1942). **The Presence of Diffusing Factor among the Metabolites of Aerobic Micro-Organisms.**—*Brit. med. J.* March 28th. 409–412.

I. Diffusing factor concentrates from testes contain a specific β-glucosaminase and it has already been suggested that the effect of testicular extracts on hyaluronic acid may be due to a complex system of enzymes rather than to one enzyme only [see *V. B.* **11.** 616–619]. Data are given which show that β-glucosaminase of testis is distinct from the enzyme or enzymes which decrease the viscosity of hyaluronic acid solutions.

II. It has been reported [MCCLEAN & HALE—*V. B.* **11.** 616.] that the viscosity of hyaluronic acid is reduced by several reducing substances: further observations on the relationship of hyaluronidase production to capsulation of streptococci indicate that decapsulation is not directly associated with any increased reducing activity of the culture caused by the metabolism of the organisms. Indications were also obtained that those strains that can secrete the enzyme make an immediate maximum response to the presence of the appropriate substrate, and the capacity of capsulated strains to synthesize hyaluronic acid is only temporarily inhibited by the presence of hyaluronidase. Examination for the development of capsules or production of hyaluronidase was made on 22 strains of group G streptococci, two group L strains, and one group M strain.

Preliminary infection experiments in mice and rabbits showed that following intraperitoneal injection in mice the uncapsulated hyaluronidase-producing strains are of very low virulence, but the capsulated group A and C strains show very great variation in the virulence of different strains. When mice are infected by the intracutaneous route the relative lethal effects of some of the hyaluronidase-producing strains, compared with capsulated strains, is greatly increased. Distinctions between the types of local lesions produced by these strains in mice are discussed. Investigations on the influence of hyaluronidase on the virulence and *in vivo* capsulation of streptococci indicate that there is some *in vivo* inhibition of the action of hyaluronidase on streptococcal capsules.

III. Using a semi-quantitative method based on the measurement of blebs produced in the skin of shaved rabbits, a large number of aerobic micro-organisms were examined for the presence and activity of diffusing factor. The organisms examined included saprophytes and pathogens of toxigenic, non-toxigenic, invasive and non-invasive types, different species of a common genus, different types of a common species, a typical yeast, several moulds, some toxin and toxoid preparations, and two samples of bacteriophage. Among the pathogenic organisms tested, diffusing factor was found only in the staphylococcus strains (both *albus* and *aureus*), pneumococcus, and streptococcus. One filtrate from the penicillium strains showed pronounced diffusing activity and a strain of *Saccharomyces cerevisiae* grown on synthetic medium showed no diffusing activity, but the filtrate of the same strain grown on 1% glucose broth gave maximal diffusion. There was no correlation between production of diffusing factor and the toxigenicity or invasiveness of the organisms tested; diffusing activity was found to be correlated with time of incubation, increasing in the first 24 hours concurrently with growth and still increasing during the stationary period in the next 24 hours, but was independent of the rate of toxin production. Formalin at 3% concentration and room temperature did not affect the diffusing activity of staphylococcus cultures, but at 37°C. the diffusing activity diminished. Heating for 30 min. at 45°C. destroyed the activity; at 55°C. it was destroyed in 10 min.—R. ALLCROFT.

AYLWARD, F. X. (1942). **Physiological Properties of the Reynals Testicular Diffusion Factor.**—*Proc. Soc. exp. Biol., N.Y.* **49.** 342–346.

Experiments on rabbits, mice, and dogs are described which demonstrate that intradermal and intravenous injections of testicular extracts increase the permeability of the capillaries. Application of testicular extract incorporated in an insulin ointment to the skin did not increase absorption, nor did the extract cause any pharmacological effects on smooth muscle or blood pressure.—R. ALLCROFT.

PARASITES IN RELATION TO DISEASE [GENERAL]

I. VOGELSANG, E. G. (1940). Contribución al estudio de la parasitologia animal en Venezuela. XIII. Huéspedes de Dirofilaria Immitis (Leidy, 1856) en Venezuela. **[Parasites of Animals in Venezuela. XIII. Hosts of *D. immitis* in Venezuela].**—*Rev. Med. vet. parasit., Caracas.* **2.** Nos. 1/2. 91–93.

II. VOGELSANG, E. G. (1940). Contribución al estudio de la parasitologia animal en Venezuela. (XIII). **[Parasites of Animals in Venezuela. XIII].** —*Ibid.* Nos. 3/4. 37–40.

I. The author found the following animals acting as hosts to *D. immitis* in Venezuela :– domestic dogs, wild canines (*Canis thous thous*), domestic cats, wild felines (*Felis pardalis* and *Felis onca*), and the Brazilian otter (*Lutra brasiliensis*).

II. The following parasites were identified in Venezuela :– *Lipoptena mazamae* (Pupipara), parasitic on bovine animals, and a common ectoparasite of deer in Venezuela ; larvae of *Cephenomyia* in the nasal cavities of deer ; *Cotylophoron cotylophorum*, a very common trematode parasite in bovine animals ; *Stichorchis giganteus*, a paramphistome parasite in swine ; *Enterobius minutus*, a nematode parasite of monkeys ; *Trichuris trichiura* in swine ; *T. campanula* in a domestic cat ; *Haemonchus contortus* in deer ; *H. similis* in bovine animals, and *Onchocerca bovis* in the ligamentum nuchae of cattle.—MILLER WATSON.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

I. GIBBINS, E. G. (1941). **Studies on the Bionomics, Control and Natural Infectivity of the Riverine *Glossina palpalis*, Subspecies *fuscipes* Newstead in the West Nile District of Uganda.**—*Ann. trop. Med. Parasit.* **35.** 195–220.

II. LEWIS, E. A. (1942). **Notes on *Glossina longipennis* and its Breeding-Places.**—*Bull. ent. Res.* **32.** 303–307.

III. NASH, T. A. M. (1942). **A Study of the Causes Leading to the Seasonal Evacuation of a Tsetse Breeding-Ground.**—*Ibid.* 327–339.

I. *G. palpalis* is found along the rivers running from the Congo border into the Nile, under conditions which are not considered to be a favourable environment for the fly, as evidenced by the striking disparity of numbers encountered under lakeside and riverine conditions. It is suggested that continual changes in the water levels of rivers make breeding grounds scattered and very temporary, and that this explains the difficulty noted by all investigators of collecting pupae. Pupae must be deposited in greater numbers than have been discovered. " Fly boys " stationed more than 10 yards from infested rivers, when these were under normal conditions, failed to take a single fly, and with the rivers in spate they only captured occasional isolated flies ; under riverine conditions these tsetse appear not to leave the river beds at all unless following a host. A wide clearing along rivers therefore serves no useful purpose. A comparison of fly density in clearings 10 yards on either side of a river by 800 yards or 400 yards long showed that in the former, it rarely exceeded 1·8 per boy per hour, whilst in the latter it might reach over 10 per boy per hour, and be as high as the density in uncleared areas. Areas which have been cleared and not maintained are more favourable to tsetse than uncleared areas, and even long grass in clearings favours the fly.

Movement of the fly up and down river valleys was considerable, two miles of rod-clearing failing to prevent their passage, as did also dense forest. It is concluded that clearings need not extend more than 10 yards from the river bank, but should be 800 yards long with the road in the centre, or in the case of villages, the clearing should extend 400 yards on either side of the village. Within the clearing, grass must be kept short. Large trees need not be disturbed provided they are not too close together ; but the lower branches should be lopped up to 15 feet from the ground.

II. *G. longipennis* has not been associated with serious outbreaks of trypanosomiasis in Kenya, possibly because it infests dry areas which have been little developed. In view of its occasional association with animal trypanosomiasis, and the proposed extension of native reserves into infested areas, a short study of the habits of the fly was made in the Voi-Makindu fly belt where it occurs in association with *G. pallidipes*.

Most specimens of *G. longipennis* were collected between dusk and dark, when the flies dart out of neighbouring thickets and settle on the road, a yard or so in front of an advancing patrol, as if prepared to attack. Attempts to attract the flies at night by lights were unsuccessful, though they apparently enter trains or motor cars passing through the belt at night. All the flies caught were males and not a single fly was caught in thicket, although they seemed to come out of this type of bush.

Larvae appeared to be deposited usually in the shade of logs or leaning trees, or around the stumps of felled trees, near shrubby or weedy thickets. Pupae were also found in open country and in the shade of a single tree in savannah. Thick bush on the banks of rivers did not appear to provide suitable conditions for larviposition. The puparium of *G. longipennis* is black and large, and is egg-shaped with a cylindrical posterior lobe, 1·1–1·32 mm. long and 1·6–1·8 mm. broad. The outer surface of the posterior lobe is ridged and contrasts strongly with the surface of the lips in puparia of other species. The posterior notch is absent.

III. N. has previously reported that in certain areas both *G. morsitans* and *G. tachinoides* move their breeding grounds at certain seasons from the edge to the centre of forests. He now records investigations into conditions in these areas, with a view to finding what stimulus causes the female to seek a new area for larviposition. The move of breeding ground is associated with an increased pupal mortality in the old area, death occurring late in pupal life. It was found that the move to the centre of the forest occurred at a season when the mean maximum shade temperature at the forest edge was over 90°F., the temperature at which, according to JACK & WILLIAMS, a negative reaction to light is induced in tsetse flies. It is suggested that it is this reaction which causes the female to seek the forest centre where the temperature just above the soil is 4–5°F. lower than at the forest edge and the evaporative power of the air is also reduced.

Whilst puparia collected in the centre of the forest, at this season, show no excessive mortality if moved to the edge of the forest, yet pupae from larvae extruded at the edge of the forest may show a mortality of 60%. Death occurs when the puparia contain fully formed adults. It is suggested that the high surface evaporation

and unsaturated soil atmosphere may affect the pupal integument at the time of pupation, rendering future emergence impossible.

It is suggested that healthy conditions for puparia of *G. morsitans* or *G. tachinoides* in the laboratory would be provided by a temperature of 72° F. with a relative humidity of 80%, or a temperature of 77°F. with a relative humidity of 100%.—U. F. RICHARDSON.

NASH, T. A. M. (1941). **Bats as a Source of Food for *Glossina morsitans* and *G. tachinoides*.**—*Bull. ent. Res.* **32.** 249.

Both *G. morsitans* and *G. tachinoides* in captivity were seen to feed readily on bats of the species *Nycteris hispida*, and it is suggested that these animals may be an important source of food for tsetse at times when game evacuate tsetse-infested areas.—U. F. RICHARDSON.

VOGELSANG, E. G., & DE ARMAS, J. C. (1940). La mosquilla del ganado, Lyperosia irritans (L.1761) en Venezuela. [*L. irritans* **in Venezuela**].—*Rev. Med. vet. Parasit., Caracas.* **2.** Nos. 1/2. 95–98.

A description of *L. irritans*, which is a common parasite in Venezuela.—MILLER WATSON.

GANSSER-BURCKHARDT, A. (1940). Beitrag zur Differentialdiagnose von *Hypoderma bovis* und *Hypoderma lineatum* schweizerischer Herkunft und deren geographische Verteilung. [**A Contribution to the Identification of *H. bovis* and *H. lineatum* of Swiss Origin and their Geographical Distribution**].—*Mitt. schweiz. ent. Ges.* **18.** 1–14.

The author discusses the differential diagnosis of the two species of ox warble-fly found in Switzerland. Observation of eggs and method of oviposition did not provide a useful method for differential diagnosis and determination of geographical distribution, since eggs were difficult to find and to differentiate. In Switzerland the eggs of both species are deposited on the hairs on any part of the body; moreover, *H. lineatum* was sometimes observed to deposit a single egg in the same way as *H. bovis*.

The most reliable character for differentiation of larvae was the presence (*H. lineatum*) or absence (*H. bovis*) of spines on the ventral surface of the tenth segment of the fifth-stage larva. In the adult, the most reliable characters were the arrangement and coloration of the hairs on the thorax and on the segment next to it, other characters being more variable.

H. bovis was found all over the country; *H. lineatum* was more numerous in the west but was rarely found in the eastern half of the country.—H. E. H.

MORISON, G. D. (1942). **Sheep Strike by the Fly, *Phormia terrae-novae* R.-D., in North-east Scotland.** [**Correspondence**].—*Nature, Lond.* **149.** 358.

Samples of blowfly larvae, collected from infested sheep in north-east Scotland in 1941, were bred to adults and identified. The first 11 samples, obtained in June and early July from widely separated farms, were all *P. terrae-novae*. Two samples in mid-July consisted of mixed *Lucilia sericata* and *P. terrae-novae*; thereafter, strike by *L. sericata* became general. [See also MACLEOD—*V. B.* **7.** 537.]

Brief notes are given on the habits of *P. terrae-novae*.—J. MACLEOD.

PARMAN, D. C., & BARRETT, W. L., Jr. (1941). **Ranch Management for Screwworm Prevention and Eradication in Texas and Adjoining States.**—pp. 8. Washington, D.C.: Bureau of Entomology and Plant Quarantine, U.S. Department of Agriculture.

This bulletin indicates the lines along which ranch practices in Texas could be adjusted so as to reduce or even exterminate the screwworm fly, *Cochliomyia americana*, by taking advantage of the seasonal vicissitudes in its life-history.

The two essential facts are, firstly that the larva needs a living wounded host, and secondly that there is no resting phase in the life-cycle, so that the species must breed continuously to survive.

The general picture presented is as follows. The species survives winter temperatures only in the extreme south, principally in certain areas in Southern Texas. In these overwintering areas the fly population shows a marked seasonal periodicity, the significant feature of which is a drop to very low levels in winter. During this winter trough there are very few suitable natural hosts available, and the species depends almost entirely on "man-made" wounds, *i.e.* seasonal husbandry manipulations such as dehorning, wounds in game animals, and the winter calving of domestic animals.

The frequency of suitable conditions for larval development with present ranch practices results in an increase of the fly population in late winter. Thus, the flies are already sufficiently numerous to be able to overflow, with the first warm weather, into the more northerly states, through natural dispersal and by importation of infested stock. The species is thus in time to take advantage of the hosts provided by the birth of young wild animals, and so multiplies rapidly; spread therefore continues to occur northwards at the earliest possible moment, and this early introduction of the fly into areas with an unfavourable winter climate allows the population to build up, by a succession of generations, to serious proportions in these areas before the advent of cold weather destroys them.

It follows that the critical time for the species is the winter, in the overwintering areas. The authors suggest that, by suspending all births of domestic animals and all wound-creating operations in these areas during the critical period for the flies, the initial populations at the beginning of each annual increase would be very low, and the time of overflow into adjacent areas be thus delayed. In areas outside the overwintering areas, castrating, docking, etc., could, as far as possible, be arranged to take place during the season of absence of the fly. Where it is impracticable to confine breeding and wound-creating operations to the "fly-free" seasons, every wound should be dressed every third day.

The authors divide Texas into four zones, for each of which they outline a time-table of farming operations designed to provide the species with the minimum of suitable hosts among domestic animals.

It is pointed out that if, by co-operation of all ranchmen, the fly population were greatly reduced in the overwintering areas, the initial infestations in more northerly areas, from which the temporary populations are built up, would occur later or not at all.—J. MACL.

VOGELSANG, E. G., & CORDERO, E. H. (1940). Las garrapatas [Ixodidae] de Venezuela. [**Ticks of Venezuela**].—*Rev. Med. vet. Parasit., Caracas.* **2.** Nos. 1/2. 71-76.

The authors list the ticks found by other workers in Venezuela and add those identified by themselves. Among the latter, those of domestic animals and birds included *Amblyomma cajennense, A. maculatum, Argas reflexus, A. persicus, Rhipicephalus sanguineus, Boophilus microplus*, and *Haemaphysalis kochi*.—MILLER WATSON.

PAWLOWSKY, E. N. (1940). Die Naturherde der Zeckenencephalitis. [**Endemic Foci of Tick-Borne Encephalitis**].—*Acta. Med. URSS.* **3.** 187–199.

PROPPER-GRASCHTSCHENKOW, N. I. (1940). Klinic und Histopathologie der Zeckenencephalitis. [**Clinical**

Features and Histopathology of Tick-Borne Encephalitis].—*Ibid.* 202–212.

SOLOWJOW, W. D. (1940). Zur Aetiologie der Zecken-(Frühjahr-Sommer) Encephalitis. **[Aetiology of Tick-Borne Encephalitis].**—*Ibid.* 484–492.

[Abst. in *Bull. Hyg., Lond.* **17.** 216, slightly amended. Signed : WILSON SMITH].

These three papers give a full account of the results of scientific expeditions during the years 1937–9, to the wooded districts of Far Eastern provinces of the Soviet Union, where tick-borne (spring-summer) encephalitis is endemic. This disease has been shown to be due to a filterable virus, transmitted to man by the bites of ticks of the family *Ixodidae*. *Ixodes persulcatus* appears to be the chief culprit and is often found to be infected with the virus even in districts where there is no human population. Virus has been recovered from the brains of several species of indigenous mammals which probably form a large virus reservoir but the ticks can also transmit the virus to their progeny through the eggs and larval forms.

The human disease has a characteristic seasonal incidence, 80 per cent. of the cases occurring in May and June. This period follows immediately upon the period of maximal activity of those species of tick known to harbour virus. Outbreaks coincide with human invasion of the woods or forestry and reclamation work. In inhabited districts domestic animals may also help in the spread of infection, for infected ticks have been found on them in all areas where the disease occurs ; moreover, virus-neutralizing antibodies are present in the sera of a considerable percentage of cattle and horses.

A clinical account of the disease in human beings is given ; the pathology and morbid histology are also described.

The virus is essentially neurotropic and infective by experimental inoculation for certain species of monkeys, rodents and birds. White mice are especially susceptible and succumb to either inoculation by various routes or the bites of infected ticks. The virus may be recoverable from the blood or the cerebrospinal fluid of human cases during the acute stages of the disease, but the method of choice is the intracerebral inoculation of mice with an emulsion of brain from a fatal case. The many strains of virus isolated at different times, in different localities and from different animal species have been found to be antigenically identical and quite distinct from the viruses of Japanese summer and St. Louis encephalitis. Many persons in endemic zones have virus neutralizing antibodies in their sera without any history of the overt disease, indicating that latent infections with resultant immunity are not uncommon.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

WU, K., & CHEN, C. Z. (1941). **A Preliminary Report on the Animal Helminths from Shanghai Abattoirs.**—*Peking nat. Hist. Bull.* **15.** 217–223.

This report records the finding of helminth parasites, chiefly in the alimentary tracts but in other organs in some cases, in representative food animals slaughtered in Shanghai abattoirs in 1935–39. The findings in 241 pigs, 85 cattle, 58 buffaloes, 54 sheep, and 20 goats are listed in order of prevalence. Their significance is discussed as regards the danger of human infestation. Schistosomiasis was found in all animals except pigs. No trichinae, *Fasciolopsis*, nor *Cysticercus cellulosae* were noted. *Ascaris* and *Trichuris* infestation in man and animals are compared. Thirteen species were found in sheep, the only previous record from this animal being by CHU & MA [(1940). *Nat. med. J. China.* **26.** 699.—Not available in the United Kingdom]. Thirteen species in the other animals are recorded for the first time from China. *Simondsia paradoxa* of the pig and *Onchocerca armillata* of cattle are more fully described and illustrated. *O. armillata*, a filarial blood parasite, is said to cause serious cattle losses, especially in the Shantung province of China.—C. V. WATKINS.

GALLIARD, H., & NGU, D. (1940). Quelques trématodes parasites des animaux domestiques au Tonkin. **[Some Trematode Parasites of Domestic Animals in Tonkin, Indochina].**—*Rev. méd. Franç. Extrême-Orient.* **18.** 131–134.

The authors record the occurrence of three trematodes in Tonkin. (1) *Fasciolopsis buski*, a common parasite of pigs in Tonkin, is rarely found in man. The parasite appears to be biologically adapted to the pig in Tonkin, but occasionally infects man. (2) *Echinostoma revolutum*, normally an avian trematode, was found in a young dog near Hanoi. In this case infection was thought to be the result of eating bird viscera heavily infested with adult flukes and not of ingestion of cercariae. (3) *Heterophyes heterophyes* was found in the small intestine of a cat. It is known to occur in man and dogs in Egypt, Palestine, and the Far East.—M. L. BINGHAM.

MENDOZA, M. A. (1940). A propósito de seis casos de Cisticerco bovis encontrados en animales sacrificados en los mataderos dependientes del Distrito Federal. **[Six Cases of *C. bovis* in Cattle Slaughtered in Caracas, Venezuela].**—*Rev. Sanid. Asist. soc., Caracas.* **5.** 471–480. [English and French summaries].

M. reports the finding of six carcasses infested with *C. bovis* in the municipal abattoirs of Caracas. This was 0·06% of the total carcasses examined. The six cases are described in detail and illustrated with photographs. M. reviews methods of control and meat inspection.

—MILLER WATSON.

DE BASTERRECHEA, L. (1940). Contribución al estudio de la cisticercosis porcina en Venezuela. **[Porcine Cysticercosis in Venezuela].**—*Rev. Sanid. Asist. soc., Caracas.* **5.** 412–424. [English and French summaries].

The author gives statistics showing that 4·09% of pig carcasses examined in Venezuela were infected with *C. cellulosae*. The total or partial condemnation of such carcasses represents a considerable loss.

He condemns the practice of diagnosing the condition in the living animal by examination of the tongue, since the percentage of infected animals showing cysts in the tongue is very small. He insists upon proper meat inspection and asks for modifications in legislation with this end in view. Lastly, he calls for an intense campaign of prophylaxis to combat a widespread condition.—MILLER WATSON.

BOLONG, D. S. (1941). **Some Observations on the Curing of Measled Pork.**—*Philipp. J. anim. Indust.* **8.** 355–369.

B. states that cysticercosis was the most frequent cause of condemnation of swine carcasses in Manila in the preceding decade, occurring in 1·1% of all pigs slaughtered and in 88·16% of those condemned. He therefore urges that methods of rendering lightly infested carcasses safe for human consumption should be utilized, under the supervision of the departments responsible for condemnations.

Experiments are described which have been carried out to determine the lethal efficiency of various methods of curing and storing infested pork and pork products. Viability of cysts before and after the various processes tested was determined on the basis of morphology and consistency of the cysts, and of their staining reaction in an acidified saturated aqueous solution of methyl green diluted five times with distilled water.

It was found that cysts were killed by boiling in water for 5 min., or in meat heated for three hours at 185°–194°F. In fresh, native type sausage, the cysts survived two weeks, but died during the manufacture of " Canton " sausage, probably because of the heating and partial desiccation involved. Salted, dried, pork (*tapa*) prepared from measled material, proved to be wholly free of viable cysts, and frying rendered this product completely safe. Dry-cured measled bacon, hams, and picnic hams never harboured viable cysts. Pickled hams, immediately after drying and smoking, often contained live cysts, but not after two weeks' storage, much less after cooking. Chilling killed the cysts in 6–8 months, but was unpractical because pork deteriorated or even spoiled completely during such prolonged chilling, particularly if measled.

Bacons, hams, and picnic hams prepared from infested meat were found to cure as satisfactorily and to absorb the ingredients as thoroughly as those from normal carcasses. Chemical tests indicated that infested meat contained more water and less protein than normal meat, but in a series of biological tests it was found that animals grew, if anything, faster and heavier on a diet of infested pork.—E. S.

Barnett, L. (1941). **The Incidence of Hydatid Disease in New Zealand.**—*N.Z. med. J.* **40.** 273–278.

This article is an annual report, with comments, on the subject of hydatid incidence. Statistics are given of the incidence of the disease in New Zealand over a period of 50 years. Figures are given indicating that approximately 50% of sheep and cattle slaughtered at the main abattoirs show evidence of hydatid infection. It is estimated that there are 200,000 dogs in New Zealand, a proportion of one dog to every eight of the population. This high ratio is equalled only in Uruguay, a country where hydatid disease is spoken of as the national malady. Of country dogs in New Zealand, one in three harbours *Echinococcus*.

The disappointing results are discussed of a campaign of education and persuasion, organized in an endeavour to reduce dog infestation.—M. B. Buddle.

Bacon, L. J. (1941). **Trichiniasis in Birmingham.**—*Brit. med. J.* Dec. 27th. 909–912.

An outbreak is recorded which involved 75 cases, of which 81% were females. The main criteria employed in the diagnoses were oedema of the eyelids and eosinophilia. Many cases were probably missed owing to mistaken diagnosis or to the illness being so mild that treatment was not required. Many of the earlier cases were at first labelled influenza, gastric influenza, kidney trouble, or rheumatism. Infestation was in the main from eating pork sausages but pig's cheek was a probable source in one case. The incubation period was seven days.

It is considered that trichinosis is endemic in the Midlands, and that small quantities of infested pork are normally present and may be eaten raw or in an undercooked state. The risk of trichinosis during wartime is increased due to the greater consumption of sausages. The increased number of women now at work and eating sausages for lunch may have a bearing on the incidence of this disease.

The intradermal test, with trichinella antigen, is considered unreliable unless supplemented by other methods of diagnosis.—H. E. Bywater.

Kerr, K. B., Jacobs, L., & Cuvillier, E. (1941). **Studies on Trichinosis. XIII. The Incidence of Human Infection with Trichinae as Indicated by Post-Mortem Examination of 3,000 Diaphragms from Washington D.C., and 5 Eastern Seaboard Cities.**—*Publ. Hlth Rep., Wash.* **56.** 836–855. [For other parts, see *V. B.* **11.** 774].

Three thousand diaphragms obtained from ten civil hospitals in Washington and from four naval and two marine hospitals in eastern seaboard cities were examined for trichinae by the direct microscopic method and a slightly modified digestion-Baerman method. 488 or 16·3% proved positive and of these 220 contained only dead larvae and 175 only live larvae, whilst 89 diaphragms contained both dead and live larvae. Of the 2,330 diaphragms from the civil hospitals, 362 or 15·5% were positive whilst of the 670 diaphragms received from the service hospitals, 126 or 18·8% were found to contain trichinae. It is considered that the percentage of positives represents a fairly accurate indication of the infection in similar U.S.A. population groups. 1·6% were found to have such heavy infestations that it was reasonable to assume that the patients had suffered from clinical trichinosis at some time during life.

The direct microscopic method was effective in detecting 93% of the positive cases where dead larvae were present, whilst the digestion-Baerman method was successful in detecting all save one of those cases where live trichinae were present.—H. E. Bywater.

I. Schoop. (1941). Derzeitiger Stand der Trichinellenfrage. [**Present Position of Trichinosis**].—*Z. Fleisch- u. Milchhyg.* **51.** 315–318.

II. —. (1941). Deutsches Reich. Runderlass des Reichsministers des Innern, betr. Bekämpfung der Trichinose. [**Germany : Circular on Trichinosis**].—*Reichsgesundheitsblatt.* **16.** 671.

III. Kolbe, F. (1937–41). Neueres über die Trichine III–VI. Uebersichtsbericht. [**Recent Knowledge on Trichinosis. III-VI. Review**].—*Z. Fleisch- u. Milchhyg.* **47.** 137–140, 198–200 ; **50.** 195–198, 207–209, 224–227, and **51.** 99–102, 277–279.

I. Observations made by S. and by others have shown that the chief hosts for trichinae in Germany are the carnivora, especially foxes and badgers ; next to these are to be noted dogs, cats, and fur animals. Carcasses of these animals lying out in the open or thrown on the manure heap may be available to wild or domestic swine. Measures to secure proper disposal of carcasses of carnivores, both wild and tame, are necessary if further progress is to be made in trichinosis control.

S. examined 892 rats and found only 0·1% infested with trichinae. Other observers had noted that rats in Germany are rarely infected, as they are in other countries (U.S.A., Norway). The observation that the rat population of abattoirs shows only a small percentage of infection suggests that this infection arises directly from the eating of trichinosed pork and that the parasite does not cause enzootics amongst the rats themselves. It is suggested that the high incidence in rat populations in the U.S.A. and Norway is not due to spread of the parasites through the rats themselves, but to faulty hygiene in handling trichina-infected meat.

II. This circular refers to recent research by various German workers which has shown that the chief carriers of trichinae in Germany are foxes and badgers

[see I]. It points out the dangers of trichina-infested carcasses of these animals being available to domestic and wild swine, and also of small pieces of meat, removed during preparation of skins, being carried off by dogs, rats, birds, etc. Appended to the circular is an order, additional to existing legislation, designed to control disposal of the flesh of the fox and the badger. Flesh of these animals is required to be rendered safe (1) by incineration, (2) by burial at least 1·5 metres deep, or (3) by cooking until the innermost meat is grey in colour.

III. These articles review works on trichinosis published during the years since part II appeared [see *V. B.* **6**. 54.] and do not lend themselves to abstraction. In each article the subject is dealt with under various headings, such as biology, transmission experiments, resistance to heat, occurrence, spread and foci of infection, and trichinosis in animals.—H. E. Harbour.

Jacob, E. (1941). Das Kotfressen der Caniden als eine mögliche Ursache ihrer Trichinose. **[Coprophagy by Canidae as a Possible Source of Trichinosis].**—*Berl. Münch. tierärztl. Wschr.* Aug. 22nd. 411–412.

Although the most rigorous measures are taken, cases of trichinosis are still recorded in Germany. J. suggests that one of the factors responsible is the general liking of dogs, pigs etc., for faeces. He relates personal and other experiences where dogs and other Canidae showed a very marked inclination to eat faeces, which were in many cases heavily infected with trichinae. Pigs are said to be more frequently infected when fed in the open than when fed in sties. J. thinks, however, that infection of pigs with trichinae from faeces is in most cases, under present conditions, only due to pollution of the pig's food with faeces.—E. R. Pariser.

Wheatley, M. D. (1940). **The Effect of Various Disintegration Products of Trichina Tissue on the Developing Larvae of** *Trichinella spiralis*.—*Trans. Kans. Acad. Sci.* **43**. 483–489.

Suspensions of trichina larvae were treated in the following ways :– (1) incubated and then autoclaved ; (2) placed in sterile containers, the suspension not being sterilized ; (3) passed through a sterile Zeiss filter ; (4) charred over a flame and the remains diluted with sterile Ringer's solution, and (5) sterilized in live steam. In the first experiment, rats and mice were fed trichinous meat and within a week were injected intraperitoneally with one or other of the first three suspensions as above. Mortality was high in both experimental and control groups. The survivors were killed at about the fifth week after feeding and counts were made under a low magnification of larvae in the diaphragms. Although these methods were not delicate, it did appear that the unsterilized autolysed suspension (2) was lethal to many of the developing larvae. In the second experiment suspensions of trichina larvae were soaked *in vitro* in one or other of the above five treated suspensions and were then fed to rats. After six weeks the rats were killed and their carcasses minced and digested. The larvae were then counted and it was found that the disintegration products of charred trichina tissue (4) as well as the autolysed non-sterile tissue (2) were lethal to developing larvae.—M. L. Bingham.

*Roetti, C. (1941). Nematodirinae parassita della capra. Nuova specie. **[New Genus and Species of Nematodirinae in Goats in Abyssinia].**—*Ann. Pat. trop. Parassit.* **2**. 244–249. [Translation of abst. in *Jber. Vet.-Med.* **69**. 115].

A cyst containing numerous trichostrongyles was found in the abomasum of a goat of the Abyssinian plateau. Close examination showed it to be a new worm, which on account of the dissimilarity of the two spicules of the male, has been named *Paramecistocirrus dimorphus*.

Wetzel, R. (1941). Zum Wirt-Parasit-Verhältnis des Fuchslungenwurmes *Crenosoma vulpis*. **[Host-Parasite Relationship of the Fox Lungworm,** *C. vulpis***].**—*Dtsch. tierärztl. Wschr.* **49**. 28–30 and 40–42.

W. points out that although some parasitic worms are truly host-specific the apparent host specificity in some cases is due to lack of opportunity of the parasite to gain entrance to another host. Experiments with the fox lungworm, *C. vulpis*, showed that dogs could be readily infested and there was no noticeable difference between the infestations in dogs and foxes either in development time, sizes and numbers of parasites, or duration of infestation. Infestation of dogs under natural conditions was, however, unlikely, as they do not normally eat the snails which act as intermediate hosts.

The time of development of the worm varied from 18–20 days in six foxes and from 18–21 days in 16 dogs. There was no correlation between development time and age of host.

Attempts made to infest cats, rats, and mice with the parasite all failed. Rats and mice fed with infected material daily over a period were killed and examined. No cysts could be found in the muscles or in any organ, and it was concluded that these animals do not act as reservoirs of infection for foxes.

One fox and four dogs, after an initial infestation, showed no resistance to superimposed infestation or to subsequent reinfestation.—H. E. Harbour.

I. Petrov, A. M., & Gagarin, V. G. (1938). Prizhiznennaya diferentsial'naya diagnostika legochnykh hel'mintozov pushnykh zverei. **[Identification of Lungworm Infestation in Living Fur Animals].**—*Trud. vsesoyuz. Inst. Helmintol.* **3**. 33–45. Moscow : Sel'khozgiz.

II. Petrov, A. M., & Gagarin, V. G. (1938). Izuchenie tsikla razvitiya vozbuditelei filyaroidoza legkikh (Filaroides bronchialis) i skryabingileza lobnykh pazukh (Skrjabingylus petrowi) pushnykh zverei. **[Life-Cycle of** *F. bronchialis* **and** *S. petrowi* **in Fur Animals].**—*Ibid.* 127–133.

I. The following helminths of the respiratory tract have been recorded in fur animals of the U.S.S.R.

In the fox (*Vulpes vulpes*) and in the raccoon dog (*Nyctereutes procyonoides*) :– *Crenosoma vulpis*, *Eucoleus aerophilus*, and *Paragonimus westermani*. In the arctic fox :– *C. vulpis* and *E. aerophilus*. In the sable, the pine marten, and the stone or beech marten :– *E. aerophilus*, *Filaroides bronchialis*, *Skrjabingylus nasicola*, and *S. petrowi*. In the mink (Lutreola lutreola) :– *F. bronchialis*, *S. nasicola*, and *P. westermani*. In the polecat, the ermine, and the ferret :– *F. bronchialis*, and *S. nasicola*. In the kolinsky (Kolonocus sibiricus) :– *C. taiga*, *F. bronchialis*, and *S. nasicola*.

C. vulpis, *C. taigo*, *F. bronchialis*, *S. nasicola*, and *S. petrowi* are viviparous and their larvae are excreted in the faeces. Diagnosis of these infestations can be made by Baerman's technique. The only nematode larvae found in fresh faeces of foxes, arctic foxes, and raccoon dogs are those of *C. vulpis*. When, therefore, larvae are found in freshly deposited faeces, a sure diagnosis of *Crenosoma* infestation can be made in northern climates. In faeces excreted 18–20 hours previously, the larvae of *Uncinaria stenocephala* and *Ancylostoma caninum* may be found already hatched from the eggs, complicating the diagnosis. In freshly

deposited faeces of sables, martens, and other Mustelidae, the larvae of *F. bronchialis* and *S. petrowi* can be detected [see II, below]. Larvae of *Molineus patens*, which infests the small intestine, may appear in older excrements.

Concise details and tables are given showing differential characters of these larvae and also tables for the differentiation of the eggs of *E. aerophilus* from those of *Trichuris vulpis* and *Capillaria plica* of foxes and raccoon dogs and from those of *C. putorii* and *C. mucronata* of sables and martens.

P. westermani has been met with in the U.S.S.R. only in the far-eastern region.

The larva is described of an unknown parasite found in 14 out of 35 newly imported Transbaikal sables. Artificial cultivation failed, probably due to lack of an intermediate host.

II. Filaroidosis of the lungs and skryabingylosis of the frontal sinus are the most common helminth diseases of the respiratory tract of sables, martens, polecats, and other Mustelidae. Larvae of both parasites are passed in the faeces. To study the further development (which did not occur in faecal cultures), the larvae of *F. bronchialis* from faeces were exposed for 1–1½ days to the snails *Succinea putris*, *Zonitoides excavata*, and *Arion intermedius* and those of *S. petrowi* to *Succinea putris* only. In both parasites, the moult to the second-stage larva takes place on the 8th–9th day after exposure, the larvae of *Skryabingylus* moulting completely, whilst those of *Filaroides* remain enclosed in a double sheath. The moult to the third-stage infective larva takes place in *Filaroides* after 20 days and in *Skryabingylus* after 15–17 days both parasites remaining ensheathed. The development of the parasites to maturity in polecats fed with artificially infected snails took 20 days in the case of *Filaroides* and 18 days in the case of *Skryabingylus*. Descriptions are given of the adult worms and of the larvae in the different stages. Measures for the control of snails are indicated, such as collection and destruction by means of chemicals, avoidance of damp and shady places for fur animal farms, and the tarring or pitching of outside walls and fences to a height of about 10–15 in. from the ground to prevent encroachment of snails from outside. In farms already infected, spraying of the soil twice yearly with 1 : 1000–1 : 3000 copper sulphate solution is advised.—A. Moldawsky.

Enigk, K. (1941). Die Bedeutung der Onchocerca reticulata (Filarioidea) für die Entstehung von Widerristfisteln beim Pferd. [**Relationship of *O. reticulata* to the Causation of Fistulous Withers in Horses**].—*Dtsch. tierärztl. Wschr.* **49.** 234–237.

E. discusses diagnosis and treatment. The presence of the parasite generally produces a small hairless patch with a papule in the centre. If exudate squeezed from the papule is examined, the larvae can usually be demonstrated.

Unsuccessful attempts were made to bring about a cure by frequent subcutaneous injections of portions of the ground-up parasite previously washed in normal saline. E. claims, however, to have cured two cases by two intravenous injections of 80 ml. of antimosan given with an interval of eight days between the injections. —N. S. Barron.

DISEASES, GENERAL

Gallo, P., & Vogelsang, E. G. (1940). Sinopsis nosográfica de las principales afecciones bacterianas, por ultravirus, y parasitarias de los mamíferos y aves domésticas de Venezuela. [**Synopsis of the Principal Bacterial, Virus and Parasitic Diseases of Domestic Animals and Birds in Venezuela**].—*Rev. Med. vet. Parasit., Caracas.* **2.** Nos. 1/2. 149–154, and Nos. 3/4. 73–82.

This is a list of diseases in Venezuela.—M. Watson.

Powley, J. O. (1942). **Diseases of Pigs with Reference to War-Time Conditions.**—*Vet. Rec.* **54.** 236. Discussion pp. 237–238.

A summary, of which most of the information is presented in tabular form. It is stated that one case of "hairless pig malady" (iodine deficiency) has been encountered in Great Britain. Cases of prerachitic tetany, identical with those described by Pickup [see *V. B.* **10.** 49 and **12.** 423.], are mentioned. The adverse effects upon health of artificial conditions of rearing are stressed.

In the ensuing discussion, Miller discussed swill-feeding, and stated that he could raise little enthusiasm for the various dried swills which were being prepared from the household waste of large centres of population. He advocated that very small amounts only of swill be allowed to animals under 75–80 lb. live weight, and that the amount be increased gradually until each pig is receiving some 10½–12 lb. of swill, which should be equivalent to 2½–3 lb. of meal, at 150 lb. live weight. He advocated dried brewer's yeast as a dietary supplement. Stableforth, Slavin, and Muir discussed work done on necrotic enteritis and swine fever which has been carried out at the veterinary laboratory at Weybridge during recent years, and of which the results are as yet unpublished. Typical necrotic enteritis had been set up by spraying the grass of a new pen with broth cultures of *Salmonella suipestifer* just before newly weaned pigs were turned onto it, and later it had been shown that oral dosage with only 2×10^6 organisms could cause definite infection. Vaccination had not produced very encouraging results, while it had been demonstrated that pigs on a complete diet could be infected at will. Nicotinic acid deficiency had not resulted in any significant difference in susceptibility to infection. Sulphapyridine and 4 : 4′-diamino-diphenyl-sulphone had been without significant effect on the course of the experimental disease, but sulphaguanidine appeared to be very successful as judged by experiments so far carried out. Examination of field outbreaks had been made on a comprehensive scale.

Swine fever was recovered from the blood of a goat 11 days after intravenous inoculation, and was passed intracerebrally through seven goats without modification of its virulence for the pig.—A. N. Worden.

Sippel, W. L. (1942). **Equine Degenerative Arthritis.** —*Thesis, Cornell.* pp. 51.

The literature on joint lesions in the horse is reviewed. Comparison is made of these findings with those observed by S. after a study of the joints of 55 horses autopsied. S. describes the synovial fossae with their location, and such lesions as wearing and erosion, grooving, and lipping. In as much as these changes are commonly found in apparently normal horses and those showing external evidence of lameness, it is difficult to determine their significance. The relation of the changes to vitamin A deficiency has not been proved, but needs further study. It is believed that the nerve changes found by Mitchell [*V. B.* **9.** 102.] are not

pathological, but due to the presence of Pacinian bodies. Certain other unidentified nerve lesions are described.
—HERBERT L. GILMAN.

FOMINYKH, V. N. (1939). Periodicheskoe vospalenie glaz loshadeĭ v Krymu. **[Periodic Ophthalmia of Horses in the Crimea].**—*Sovyet. Vet.* No. 9. pp. 64–67.

In the U.S.S.R., periodic ophthalmia of horses has been observed in southern and middle regions and in the Far East. In the Crimea, F. examined about 5,000 horses of which 305 (6·1%) were found to be affected with this disease. The horses of 20–40% of farms were affected. Of the above affected animals 182 were chronic, 96 " recidives " [? first relapses], and 27 acute cases. The disease was observed in working horses as well as in studs. Contrary to the observations of many others, young horses were less affected. Six out of 15 affected foals and colts aged 6–24 months were the progeny of affected mares. Out of 27 acute cases, eight contracted the disease during spring and 19 during the summer months. In F.'s experience the incidence of the disease is not influenced by the season, the geological type of the soil, the water, or the sex or colour of the animals. He suggests that inadequate hygienic conditions and inadequate feeding, poor in vitamin A and minerals, are important factors in the aetiology of this disease.

F. approves of the recent regulation of the Crimean veterinary department which insists on the examination of the eyes of all animals in the course of annual mallein tests, and isolation and treatment [not indicated] of all affected animals. He also urges more research on aetiology, especially on the influence of vitamins and minerals.—A. MOLDAWSKY.

GRATZL, E. (1941). Osteorenales Syndrom beim Hund. **[An Osteo-Renal Syndrome in Dogs].**—*Wien. tierärztl. Mschr.* **28.** 225–234.

Six dogs, 5–13 years old, with chronic interstitial nephritis (usually following leptospirosis) showed loosening of the teeth and softening of the jawbones. Radiographs revealed marked osteoporosis and decalcification. Histological examination of one case showed osteodystrophia fibrosa which was hypo-osteotic in type (compared with hyperosteotic type in which there is an increase in size of affected bones due to deposition of osteoid tissue).

There appears to be no mention in veterinary literature of an aetiological connexion between kidney disease and osteoporosis although such a relationship is well recognized in children (" renal rickets "). G. suggests that the syndrome in the dog develops from lowering of the alkali reserve of the blood and acidosis leading to withdrawal of calcium from the bones to keep up the level of blood calcium. The osteoporosis which results is later followed by osteodystrophia fibrosa. In two of the dogs in which the blood was examined there was a marked fall in the alkali reserve.—E. G. WHITE.

JENNINGS, W. E. (1941). **Equine Abortion and Diseases of Foals.**—*Vet. Med.* **36.** 452–464.

The breeding results of the Front Royal remount depot, Virginia, during the preceding five years, are recorded. The types of abortion are described under four headings, *viz*, those due to *Salmonella abortus-equi*, to streptococcal infections, to a virus, and to miscellaneous causes. To a large extent the findings of DIMOCK & EDWARDS (1926) were used as a guide to the differential diagnosis of these diseases. Observations on the control of abortion in mares are outlined. The risks following breeding at the ninth day after darturition and its danger if any abnormality of the mare exists are emphasized. Bacteriological examinations of barren and maiden mares are advised.

Infection of foals, often prenatal, due to *Bacterium equirulis*, *Bact. coli*, streptococcal infections, *S. abortus-equi*, and *Corynebacterium equi* is described. The curative value of the dam's blood for several of these infections is stressed. Abortion rates for the particular stud, percentage of conceptions, living foal percentages, etc., under what must be considered almost ideal conditions, are given in tables.—C. V. WATKINS.

ROSENBERGER, G. (1941). Die Unfruchtbarkeit der jungen Ziegenböcke und Massnahmen zur Verhütung der durch sie bedingten wirtschaftlichen Schäden. **[Infertility in Young Goat Bucks and its Prevention].**—*Dtsch. tierärztl. Wschr.* **49.** 449–454 and 465–467.

R. reviews the causes of infertility in goat bucks. The commonest cause is testicular hypoplasia, due evidently to unnatural living conditions; the second cause is the so-called *Samenstauung* (sperm blockage) in which the epididymis ducts are not properly patent, a result of embryonic mal-development. Various other less important causes of infertility have also been observed, as in bulls.

R. examined the young male goats at four goat markets in lower Saxony, at which they are sold as potential breeding animals at about five months of age. Among 500 goats examined in 1940, he detected 28 which would be infertile (25 on account of testicular hypoplasia and three of sperm blockage). After the ensuing breeding season, a further 31 of these goats proved to be infertile. He advises the institution of semen tests on young goat bucks at an early date in their first breeding season.—J. E.

SMYTHE, R. H. (1942). **Infertility in Guernsey Cattle.**—*Vet. Rec.* **54.** 222–223.

S. considers that the development of the pedigree milking cow has already gone too far and that most breeding troubles are the result of selective breeding, intensive feeding, and conditions far removed from those which are natural to the species. The result is a physiological disturbance followed by the appearance of " lethal factors ".

Various specific aspects of sterility in the Guernsey breed such as failure or delay in ovulating and failure to develop follicles, are discussed.

S. is of the opinion that the health of the ovum is apt to be overlooked and that this, as well as the spermatozoa, are directly influenced by the methods of management. In this respect malnutrition and the bull's being deprived of exercise and light are prominent factors.
—N. S. BARRON.

SCHMITZ, F. (1940). Vorbeuge und Behandlung der Zuchtkrankheiten in einer der grössten rheinischen Viehwirtschaften. **[Prevention and Treatment of Breeding Diseases in One of the Largest Livestock Establishments of the Rhine].**—*Berl. Münch. tierärztl. Wschr.* Nov. 15th. 549–551.

S. records observations over a period of seven years on an 850-acre farm carrying 260–360 cattle and 40 horses. Mastitis had been eradicated by hygienic measures and regular bacteriological examinations, infected cows being dried off and fattened. The herd was heavily infected with contagious abortion, which had previously been treated by quarterly inoculations of " Schreiber's abortin ". Although most cows carried their calves to full term, the heifers continued to abort after these inoculations. A double inoculation with live *Br. abortus* culture was then made, at least a month being allowed to elapse after the second injection before service. Results were excellent, no abortions

occurring and no further inoculations being required. Calf diseases were kept well under control by hygienic and prophylactic measures, with the exception of husk; the weaker calves sometimes succumbed to this. Intratracheal injection of 50 ml. of 2% potassium picrate solution had been undertaken in these animals.

Among the horses, contagious abortion and joint-ill had been common, but had gradually died out in the whole district, possibly due to the development of a natural immunity. Umbilical fistulae were common and appeared to be hereditary, three-quarters of the colt foals being affected and some fillies. The pastures were flooded regularly by the Rhine, and the deposit left by the river was a rich source of minerals.

—Ann F. Russell.

Phillips, R. W., & Zeller, J. H. (1941). **Some Factors Affecting Fertility in Swine.**—*Amer. J. vet. Res.* **2.** 439–442.

An analysis was made of the fertility records for the years 1926–38 of the U.S. Animal Husbandry Experiment Station herd at Beltsville, Maryland. The animals were of six different breeds, and comprised 382 sows (with 1,354 breeding seasons) and 233 boars. Interpretation of the results was complicated by the high incidence of brucellosis. Certain breed differences were noted, but the authors are careful to state that these are probably not applicable to the breeds as a whole.

It was assumed that deaths of embryos *in utero* were the same (31%) as those observed elsewhere by Hammond (1921) and by Corner (1923), and the fate of ova shed by all sows at oestral periods during which they were mated was calculated to be :– loss from failure to conceive, 36% ; loss during gestation 20% ; loss at parturition 2% ; loss from birth to weaning, 15%, and live pigs at weaning, 27%. The level of fertility among different boars appeared to be very variable.

The need for further studies on uninfected herds is rightly emphasized.—Alastair N. Worden.

Ludden, J. B., Bruger, M., & Wright, I. S. (1942). **Experimental Atherosclerosis. IV. Effect of Testosterone Propionate and Estradiol Dipropionate on Experimental Atherosclerosis in Rabbits.**—*Arch. Path.* **33.** 58–62. [Authors' summary copied *verbatim*].

In female rabbits fed cholesterol the development of hypercholesteremia was inhibited and the deposition of cholesterol in the aorta was prevented by the administration of testosterone propionate or estradiol dipropionate. In male rabbits fed cholesterol these steroids exerted little or no such protective action.

Dayus, C. V., Taylor, B. A., & Thompson, G. A. (1941). **Congenital Goitre in Lambs.**—*N.Z. J. Agric.* **63.** 387–388.

A fatal disease in lambs described as congenital goitre is reported in the South Island. Chemical analyses of soil and pasture samples are contemplated.

—M. B. Buddle.

—. (1941). **Sanitary Products on the Poultry Farm.**—*Soap.* **17.** No. 5. 90–93 and 109.

In parts of the U.S.A. it is not unusual for the mortality rate amongst poultry to exceed 30% in a year, while the so-called "standard" mortality of a flock is placed at 12%. This figure is much too high in the light of all that is known about poultry diseases.

Suggested control measures discussed are disinfection, and the control of known intermediate carriers of disease.—W. Moore.

László, F. (1941). Pathologische Anatomie des Hornes. [**Pathological Anatomy of the Horn**].—*Dtsch. tierärztl. Wschr.* **49.** 183–185.

A variety of conditions is mentioned, including absence of horns, hypoplasia, atypical, multiple and cutaneous horns, shedding of the horn, fracture, and osteoma following injury. There is nothing new in the article.—E. G. White.

NUTRITIONAL AND METABOLIC DISORDERS

Piazza, C., Mettler, E. A., & Saetone, A. (1941). Pluri carencia nutritiva en ovinos. [**Nutritional Diseases in Sheep**].—*Bol. tec. Direcc. gen. Agric. Ganad., B. Aires.* Secc. ganad. No. 4. pp. 183–213.

Examinations were made of pastures, soil, rock, water, and climatic data to investigate the reason for a large increase in the mortality rate of sheep on a farm south-east of Buenos Aires. It was found that mortality was not, in the majority of cases, the result of infectious diseases. The two factors chiefly responsible seemed to be (a) lack of mineral salts (mainly P) and proteins in the animals' food, and (b) parasites. The most important of the latter were *Fasciola hepatica* and *Thysanosoma actinioides*. The relations between these factors and the quality and composition of the wool are discussed.

—E. R. Pariser.

McCay, C. M. (1941). **The Nutritional Requirements of Dogs.**—*Cornell Vet.* **31.** 160–169.

The nutrition of the dog is dealt with from the practical standpoint. The tinned dog-foods, which form a highly important article of canine dietaries in the U.S.A. are, as far as better class products are concerned, of similar composition, *viz*, meat meal 10–25%, maize and wheat products 50–60%, soya bean meal 5–10%, dried skimmed milk 5–10%, and under 5% of such products as yeast, bone meal, fish meal, wheat germ meal, cod liver oil, etc. These foods form an excellent dietary basis, but care should be taken to guarantee additional vitamin A, since this vitamin may be lost during storage. Such foods are low in fat also.

It is maintained that there is no real evidence for claiming that glucose is either superior or inferior to starch as a source of carbohydrate for the dog. M. has maintained dogs in health for months on a diet half composed of potatoes.—Alastair N. Worden.

McCay, C. M. (1942). **Biochemic Aspects of Canine Nutrition.**—*J. Amer. vet. med. Ass.* **100.** 407–410.

This is a review which contains no new material, but which emphasizes a number of practical points, *e.g.* that large dogs may develop rickets on a diet which is adequate for the smaller breeds, and that tomato or grapefruit pulp seems to assist in promoting normal faecal formation. The book, "The Nutrition of Carnivora", written by Bischoff & Voit in 1860, is stated to have been probably the most extensive work ever devoted to dog nutrition, and to be of considerable value even to-day.—Alastair N. Worden.

Baltzer, A. C., Killham, B. J., Duncan, C. W., & Huffman, C. F. (1941). **A Cobalt Deficiency Disease Observed in Some Michigan Dairy Cattle.**—*Quart. Bull. Mich. agric. Exp. Sta.* **24.** 68–70.

A disease of dairy cattle in Michigan known as "Grand Traverse" or "Lake Shore" disease occurs during the winter and early spring months, despite the feeding of good balanced diets. The cattle become

unthrifty, develop morbid appetites, become emaciated, and finally refuse to eat. They calve in a normal manner, but the offspring die off in 2–6 weeks. The milk yield drops or even ceases. The possibility of P deficiency or ketosis was ruled out by feeding bone meal and molasses and by blood analyses. The haemoglobin values of affected animals were as low as 6–9 g.% and those of mildly affected cattle 8–10 g.%.

The feeding of 13 mg. Co (as the chloride) per head per day produced a spectacular improvement in condition, appetite and milk yield. The Hb values after a preliminary fall, rapidly improved under treatment although not as rapidly as was desired. Preliminary analyses indicated that hay from affected farms contained only one-third to one-half as much Co as those from unaffected farms. [No actual figures are given].

Since the only treatment was Co therapy, the evidence favours the view that Co deficiency is responsible for the disease.—Alfred Eden.

Filmer, J. F. (1941). **Cobalt Deficiency in Sheep.**—*N.Z. J. Agric.* **63.** 287–290.

While top-dressing with cobaltized superphosphate is now widely recognized as a convenient and efficient method of preventing " bush sickness ", there are some areas where, for various reasons, top-dressing is not practised and the cobalt must be supplied in some other way. Field trials were conducted in an endeavour to determine the efficiency of monthly drenching of ewes and lambs in comparison with the more usual method of allowing free access to cobaltized licks. The experiments indicated that drenching at monthly intervals with very large doses of cobalt will keep ewes and lambs alive on " bush-sick " country and will even cure " bush sickness ". Lambs treated in this way do not grow nearly as rapidly as those drenched once or twice weekly or as those grazing on pasture top-dressed with cobaltized superphosphate. Monthly drenching with very large doses of cobalt gave results similar to those obtained from giving free access to cobalt lick, but it was more expensive, as the drenched lambs received about 50 times as much cobalt as the lambs on lick. In view of these results monthly drenching should not be practised where top-dressing is possible or where sheep will take licks. The recommended monthly drench for both ewes and lambs is ½ fl. oz. of a solution of 1 lb. of cobalt sulphate in 2 gal. of water. [1 gal. of water, as appears in text, is a printer's error.]—M. B. Buddle.

Rusoff, L. L. (1941). **Distribution and Concentration of Copper in the Newborn Calf as Influenced by the Nutrition of the Dam.**—*Bull. Fla agric. Exp., Sta.* No. 356. pp. 61.

Comparison was made of the Cu content of all the principal tissues and organs of three newly born calves from normal mothers and of one calf from a " salt-sick " dam [see also *V. B.* **12.** 460]. Determinations were also made of total weight, and moisture and ash contents of the various organs. Cu was found in every organ and tissue analysed, and by direct calculation it was found that the entire normal newborn calf contained about 237 mg. Cu and one from a " salt-sick " dam about 270 mg. Apart from the skeleton which was much lower in Cu, the calf of the " salt-sick " dam showed a higher Cu content in its tissues and organs than the normal calves. From the data there is some suggestion that bone serves as a site for Cu storage.

The condition of " salt sickness " in the mother did not affect the Cu storage in the calf, nor does a calf from a " salt-sick " dam show any manifestation of the disease. Despite the very extensive data given, no definite conclusions could be drawn concerning the role of Cu in the pathogenesis of the disease.

An extensive survey of the literature on the occurrence of Cu in the tissues of the bovine animal is given.—Alfred Eden.

Schaible, P. J., & Bandemer, S. L. (1942). **The Effect of Mineral Supplements on the Availability of Manganese.**—*Poult. Sci.* **21.** 8–14.

Experiments were undertaken to determine the effect of insoluble Ca and P on the availability of manganese in chick rations. *In vitro* tests showed that Mn was not removed from solution as the insoluble hydroxide or phosphate but was removed from solution through adsorption by solid mineral. Phosphates and carbonates adsorbed Mn efficiently at acid reactions similar to those in absorptive areas of the intestine. Phosphates were better adsorbents than carbonates. The Mn concentration remaining in solution after adsorption was dependent upon the amount originally present. Organic constituents in the ration also removed Mn from solution, but Mn removed by them would be released during digestion and absorption and could be utilized by the chick. Feeding tests corroborated the results of *in vitro* experiments.

A laboratory determination of acid-soluble Mn of a ration might be of value in judging its perosis-producing capacity, if consideration were given to the level of Ca and P.—F. D. Asplin.

Hammond, J. C., Miller, D., & McClure, H. E. (1942). **Interference of Heated Diets with Calcification in Chickens.**—*Poult. Sci.* **21.** 185–188.

There are indications that factors besides Ca, P, Mn, and vitamin D are necessary for normal calcification of bone. In experiments with groups of 25 young chickens the results showed that the tibiae of chicks, on a diet deficient in P, had a low ash content without any external manifestation of skeletal deformity. The same diet when heated resulted in bone deformity. Addition of choline hydrochloride and calcium pantothenate reduced the bone deformity, but the bone ash was well below normal. 0·03 g. *p*-aminobenzoic acid per 100 g. feed, appeared to be necessary in the absence of sufficient P.

Additional cod liver oil and supplements rich in available P were effective in promoting normal bone development.—F. D. Asplin.

Krzywanek, F. W. (1942). Das Säure-Basen-Gleichgewicht bei der Lecksucht des Rindes. **[The Acid-Base Equilibrium in Pica in Cattle].**—*Berl. Munch. tierärztl. Wschr.* Feb. 20th. 55–58.

The urine of cattle with pica was found to have a higher pH, a more alkaline ash, a reduced CO_2-combining power in the Van Slyke apparatus, and a higher titratable alkalinity than that of normal animals. A consideration of these points suggested that an increased quantity of organic acid was present and investigation confirmed this increase. If the animal has an unimpaired acid-base equilibrium, this excess acid will result in the excretion of excess alkali to counterbalance it, but will not deplete the blood alkali. But if the animal for any reason cannot supply this alkali, the urine will be acid, and the blood will show a condition of acidosis, as is sometimes found.

The cause of the increased output of organic acid is unknown.—J. G. Carr.

Yuile, C. L. (1942). **Hemoglobinuria.**—*Physiol. Rev.* **22.** 19–31.

Experimental observations relating to the elimination of haemoglobin by the kidney are reviewed. Although it is generally accepted that haemoglobin escapes through the glomerulus, there is little agreement about the way in which it does so, but it appears that

some increase in glomerular permeability is frequently associated with haemoglobinuria. The evidence indicates that glomerular injury is not the fundamental mechanism of haemoglobin excretion and it is suggested that the glomerulus may contain pores large enough to allow the passage of haemoglobin molecules under certain conditions.—R. ALLCROFT.

I. —. (1942). **Hypoglycemia in Newly Born Pigs. —Baby Pig Disease.**—*Vet. Med.* **37.** 36–38.

II. SAMPSON, J., HESTER, H. R., & GRAHAM, R. (1942). **Studies on Baby-Pig Mortality. II. Further Observations on Acute Hypoglycemia in Newly Born Pigs (So-Called Baby-Pig Disease).**—*J. Amer. vet. med. Ass.* **100.** 33–37. [For part I, see *V. B.* **12.** 231].

I. The clinical features of the disease which has made its appearance during recent years in Illinois [see *V. B.* **12.** 231.] are described. In an attempt to reproduce the condition experimentally, seven newly born pigs from three litters were allowed to suckle until they were about 120–140 hours old, and were then fasted completely for 6–7 days. The average blood sugar level fell from a pre-fasting level of 122 mg. to 85 mg. per 100 ml., which was still well above the levels recorded in natural cases of the disease. None of the characteristic symptoms was induced by fasting.

II. Losses due to the disease in 25 naturally affected herds ranged from 1–22 litters, representing 5–29% of all newborn animals during a single farrowing season. The mortality in clinically affected litters was seldom less than 75%, and often reached 100%. The mothers were unaffected apart from transitory disturbance due to agalactia. Seasonal and other factors are not completely established, but all breeds appear to be susceptible. No evidence has been obtained of qualitative nutritional deficiency or of characteristic gross pathological changes. Nothing abnormal has been detected in maternal blood or urine, in affected piglet urine, or in affected piglet blood except for the low blood sugar previously reported. Glycogen was found to be absent, or present in traces only, in the livers of affected piglets, whereas in four normal piglets, 12–48 hours old, 2·01–3·02% was found to be present.

It is stated that a condition apparently indistinguishable from the natural syndrome was induced by fasting half the members of a litter after an initial suckling period of 4–6 hours (four instances) or 10–12 hours (one instance). The remaining half-litters, which were allowed to remain on their respective sows, were reared normally.—ALASTAIR N. WORDEN.

*NICKISCH, K. (1940). Versuch über den Calcium-Phosphorsäure-Stoffwechsel bei Schweinen mit besonderer Berücksichtigung von Mono-, Di- und-Tri-Phosphat. **[Calcium-Phosphorus Metabolism of Swine with Reference to Mono-, Di, and Tri-Phosphate].**—*Biederm. Zbl.* **12.** 322–367. [Abst. from abst. in *Jber. Vet.-Med.* **68.** 10].

N. found that the administration of mono-, di-, and tri-Ca phosphate to pigs of varying age and weight did not cause any difference in the quantities of Ca retained. This was observed in young as well as in mature animals. The retention of P and N was not influenced by the kind of phosphate that was administered. The quantity of Ca, P, and N retained was also observed when the animals were fed on barley and fish powder to which no Ca had been added.—E. R. PARISER.

EARLE, D. P., Jr., & VICTOR, J. (1942). **The Effect of Various Diets on the Liver Damage Caused by Excess Cystine.**—*J. exp. Med.* **75.** 179–189.

A comparison was made of nine different diets which demonstrated the effects of different protein, fat, carbohydrate, and yeast concentrations on the hepatic lesions produced in rats by 10% and 5% cystine in the diet. Haemorrhage in the liver was most severe with high fat intake; necrosis was more severe with synthetic diets regardless of the proportions of fat, protein, carbohydrate, or yeast, than with natural food diets; cirrhosis was less severe on a high lard and cod liver oil diet than on high butter; fatty infiltration was found consistently only with low protein, high fat diets. 1% choline in the diet prevented this increase in liver fat, but did not protect the liver against damage by cystine. There was no apparent correlation between fatty infiltration of the liver and the incidence or degree of cirrhosis. These results show that not only is the degree of cystine damage to the liver affected by diet, but that the pathogenesis of the lesion is also dependent on the diet.
—R. ALLCROFT.

WINTER, I. C. (1942). **Fat Metabolism after Liver Injury. Fatty Acid Utilisation by Rats Treated with Carbon Tetrachloride on Diets which were Fat-Free or Contained Fats with High or Low Iodine Numbers.** —*J. biol. Chem.* **142.** 17–24.

Rats receiving an essentially fat-free diet showed a much reduced fatty acid utilization compared with normal or carbon tetrachloride-treated animals on higher fatty acid intake. This shows that fatty acid synthesis was not marked in any of these animals nor was synthesis increased by CCl_4 treatment at the rate of 0·05 ml. subcutaneously every other day. Fatty acid utilization of CCl_4-treated animals receiving a stearate diet was much below that of normal littermate controls. It is concluded, therefore, that CCl_4 does not increase fatty acid synthesis, and lack of abundant quantities of non-essential, unsaturated fatty acids is the prime factor in decreased utilization of fatty acids which follows liver damage.—G. D. S.

MULINOS, M. G., & POMERANTZ, L. (1941). **The Reproductive Organs in Malnutrition. Effects of Chorionic Gonadotropin upon Atrophic Genitalia of Underfed Male Rats.**—*Endocrinology.* **29.** 267–275.

The authors have previously shown that prolonged underfeeding leads to marked depression of the endocrine glands, the changes resembling those following hypophysectomy. It is now demonstrated that the changes can be corrected by the injection of chorionic gonadotropin ("follutin").

The main changes during chronic inanition were :– (1) atrophy of the accessory sex organs; (2) atrophy of the interstitial cells of Leydig; (3) loss of weight of the testes and diminution in size and spermatogenic activity of the testicular tubules, and (4) sterility due to a combination of (1), (2), and (3). Endocrine therapy for the cure of these conditions is discussed.

It is concluded that in underfed rats, sterility and other defects are due to an insufficiency of gonadotropic hormone resulting from depression of the pituitary gland.—F. AYLWARD.

—. (1942). **Vitamins and Other Agents of Importance in Livestock Feeding 1941.**—*Anim. Path. Exch. Univ. Ill.* pp. 4. [Mimeographed].

Information relating to various avitaminoses, and their symptomatology and pathology, as well as to the sources of the vitamins in question, is presented in tabulated form. There is no new material.—A. N. W.

SCHMIDT, H. (1941). **Vitamin A Deficiencies in Ruminants.**—*Amer. J. vet. Res.* **2.** 373–389.

Observations were made upon five Jersey cows which developed vitamin A deficiency in 1931, the case

histories being given in detail, and upon a series of experiments on store cattle, sheep, and goats carried out during 1934–41. The syndrome of avitaminosis A in cattle was found to commence with night blindness, and appears to have resembled that described by other workers; fluctuating swellings of the limbs were common. The condition was produced by feeding exclusively on cottonseed bulbs and cottonseed meal, and could be cured readily by cod liver oil and green food or by crystalline carotene in oil. 450 μg. of carotene per 100 lb. live weight daily were inadequate to prevent ultimate death from vitamin A deficiency of five Hereford steers, although fattening occurred during the lengthy survival periods (145–993 days). In the case of Jersey cows, levels up to 2,500 μg. per 100 lb. live weight daily were found to be inadequate for normal health and lactation.

Mature sheep and goats were found capable of surviving for about 300–800 days on a carotene-free diet, but attempts to determine the initial reserves in comparable animals are not recorded. It was found difficult to assess night blindness in these species, and no other convenient guide to early deficiency was found. Urolithiasis occurred in five out of 14 castrated yearling goats on an A-free diet, and in seven others there was urethral occlusion on one or more occasions.

The paper contains a number of good photographs.
—Alastair N. Worden.

Boyer, P. D., Phillips, P. H., Pounden, W. D., Jensen, C. W., Rupel, I. W., & Nesbit, M. E. (1942). **Certain Relationships of Avitaminosis A to Vitamin C in the Young Bovine.**—*J. Nutrit.* **23.** 525–531.

Eight Holstein and three Guernsey calves were maintained on a basal vitamin A-deficient diet supplemented by various amounts of carotene or vitamin A. The symptoms and biochemical changes of avitaminosis A, *e.g.* low plasma vitamin A, papilloedema, and increased intracranial pressure, were accompanied by a fall in the ascorbic acid contents of plasma and cerebrospinal fluid, the plasma ascorbic acid levels tending to vary directly with the plasma vitamin A values. In some cases the administration of ascorbic acid was followed by a fall in intracranial pressure.

The c.s.f. of normal calves was found to contain 1·64–2·42 mg. of ascorbic acid per ml., *i.e.* 5–10 times as much as the blood plasma. The normal intracranial pressure was 100–200 mm. Hg.—Alastair N. Worden.

Holmes, A. D., Tripp, F., Ashbrook, F. G., & Kellog, C.E. (1941). **A Study of Vitamin A in the Nutrition of Foxes.**—*Wildl. Res. Bull. U.S. Dep. Interior.* No. 3. pp. 15.

Values are given of the vitamin A content of the livers of wild and captive foxes of different breeds on various diets. There is apparently no correlation between liver vitamin A reserve and pelt quality, but it is emphasized that the vitamin A requirements of pregnant lactating and growing animals are probably much higher than those of foxes about to be pelted.
Alastair N. Worden.

Baumann, A. (1939). Ueber Veränderungen am Gangepithel der Bauchspeicheldrüse der Ratte im Vitamin A-Mangelversuch. **[Changes in the Epithelium of the Pancreatic Duct in Rats Deprived of Vitamin A].**—*Franfurt. Z. Path.* **53.** 551–558. [Abst. in *Nutr. Abstr. Rev.* **11.** 396, copied *verbatim.* Signed: H. H. Gordon (U.S.A.)].

In 5 white rats which received Sherman's diet deficient in vitamin A for 102 to 185 days the epithelium of the pancreatic duct showed a peculiar budding overgrowth which did not resemble the epithelial metaplasia described by Wolbach and Howe.

Smith, M. C., Sayre, N., & Blanchard, E. (1941). **Effectiveness of the Sunlight in Tucson, Arizona, for the Prevention or Cure of Rickets.**—*Tech. Bull. Ariz. agric. Exp. Sta.* No. 90. pp. 171–195.

The ability of local sunlight to prevent and cure rickets in rats was estimated at different times of the day throughout the calendar year. The efficiency recorded was remarkably high at all times of the year, and compared most favourably with values reported from other parts of the U.S.A. Complete protection of animals on a rachitogenic diet was afforded by as little as 1–2½ minutes' exposure in summertime, and by 10 minutes' exposure in January and February. Diurnal variations were greater in the winter months.

Indirect sunshine, or "skyshine" was likewise effective throughout the year, 10–30 minutes' exposure being effective; in this case there was little seasonal variation.

It is considered that solar ultra-violet light deficiency is unlikely to occur in farm practice in Arizona.
—Alastair N. Worden.

Johnson, D. W., & Palmer, L. S. (1941). **Meeting the Vitamin D Requirement of Pigs with Alfalfa Hay and Winter Sunshine.**—*J. agric. Res.* **63.** 639–648.

During the winters 1935–37, a series of three experiments was conducted with newly weaned pigs of the Duroc-Jersey, Poland China, and Hampshire breeds. The basal diets consisted mainly of maize, dry-rendered tankage [meat scraps], and a mineral mixture of varying Ca and P content. Access to known amounts of sunshine was permitted in some cases, while certain controls received irradiated yeast as a source of vitamin D. Plasma Ca values were taken as an index of rachitogenesis, and in those animals in which rickets had been allowed to develop, curative measures were adopted in the form of access to sunshine and of feeding hay of known vitamin D content.

The rachitic condition could be cured by exposure to January or February sunshine for 45 min. daily over a two-weeks' period, or by giving alfalfa hay which provided 200–250 I.U. of vitamin D daily when fed as 5% of the ration. Hay which provided rather more than half this amount of vitamin D was sufficient to prevent, but not to cure, the condition. Animals receiving the basal diet and voluntary access to winter sunshine became rachitic.

The amount of vitamin D required was inversely proportional to the Ca and P content of the ration.

[It is interesting to note that some pigs developed a pre-rachitic tetany; see also Pickup—*V. B.* **12.** 423.]
—Alastair N. Worden.

Sjöberg, K. (1941). Experimentell rachitis hos hundvalpar. **[Experimental Rickets in Puppies].**—*Svensk VetTidskr.* **46.** 1–8.

Comprehensive experiments were carried out with Great Dane puppies. A basic diet was used, with varying additions of Ca, P, and in some cases of vitamin D which was restricted by limiting access to daylight. Observations were made of growth, clinical symptoms, mineralization of the skeleton (by X-ray photography), metabolism and retention of Ca and P, chemical changes in the blood plasma (Ca : P ratio and phosphatase content), and analyses of skeletal ash, particularly of the femur.

S. found no justification for the theory that the chief function of vitamin D is to regulate mineral metabolism mainly by increasing retention, but agrees with Wilton

that this vitamin stimulates the division and differentiation of the bone-forming cells, and thus ensures that degree of maturity which is a necessary preliminary to normal ossification.

MACKENZIE, C. G. (1942). **Cure of Repeated Attacks of Nutritional Muscular Dystrophy in the Rabbit by Alpha-Tocopherol.**—*Proc. Soc. exp. Biol., N.Y.* **49.** 313–317.

From 4–6 attacks of severe muscular dystrophy were produced in five young male and two female rabbits by feeding on a diet deficient in vitamin E, and diagnosed by excessive creatinuria, loss of weight, reduced food consumption, and physical symptoms. The first three attacks were cured by administration of 5–15 mg. of α-tocopherol and subsequent attacks by 20–40 mg. Severe hyalinization and necrosis with increased cellular elements were detected in stained sections of the thigh muscles of three rabbits allowed to die after the fourth or fifth attacks, and were absent from corresponding muscles in the four recovered rabbits. Testicular degeneration was not observed in either affected or recovered rabbits.—R. O. MUIR.

*SORTERUP, E. (1941). **[Lip Wounds in Fox Pups].**—*Norsk VetTidsskr.* **53.** 186–187. [Abst. from abst. in *Wien. tierärztl. Mschr.* **28.** 569].

This condition is, according to SALOMONSEN, caused by lack of prothrombin or vitamin K in the blood. Vitamin K is produced endogenously by coliform bacteria in the intestinal tract. Blood transfusion from adult animals effects a rapid cure. As an alternative treatment, S. has used extensively and with good results injections of coliform serum. He admits the possibility that the latter may itself contain either prothrombin or vitamin K.—M. LANDAU.

I. GREEN, R. G., EVANS, C. A., CARLSON, W. E., & SWALE, F. S. (1942). **Chastek Paralysis in Foxes. B_1 Avitaminosis Induced by Feeding Fish.**—*J. Amer. vet. med. Ass.* **100.** 394–402.

II. GREEN, R. G., CARLSON, W. E., & EVANS, C. A. (1942). **The Inactivation of Vitamin B_1 in Diets Containing Whole Fish.**—*J. Nutrit.* **23.** 165–174.

I. This paper provides a general account of the disease, and is illustrated by examples which for the most part have already been published [see *V. B.* **11.** 892]. The point is made that whereas an occurrence of the disease in pregnant vixens leads to foetal death and abortion, a moderately severe outbreak occurring just before the breeding season does not appear to interfere with reproduction.

II. Vitamin B_1 hydrochloride was fed in varying amounts to groups each composed of 10 six-month-old red foxes receiving a diet containing 20% of whole uncooked carp: 1 mg. per day delayed the onset of Chastek paralysis by a few days, and 2 mg. per day delayed it for about a month; 5 mg. per day permitted the development of mild symptoms only, while 10 mg. per day completely prevented the disease. The quantitative relationship of vitamin B_1 deficiency to the disease was thus established.

Foxes developed Chastek paralysis when fed carp skin, scales, fins, skeletons, and heads, or carp viscera, but not when fed carp muscle. It is stated that in practice it appears to be a safe procedure to feed whole fish on several days of the week, and a diet containing adequate vitamin B_1 on other days.—A. N. WORDEN.

SCHAEFER, A. E., MCKIBBIN, J. M., & ELVEHJEM, C. A. (1942). **Studies on the Vitamin B Complex in the Nutrition of the Dog.**—*J. Nutrit.* **23.** 491–500.

The addition of 100 μg. vitamin B_1, 100 μg. riboflavin, 2 mg. nicotinic acid, 60 μg. vitamin B_6 hydrochloride, 50 mg. choline chloride and 500 μg. calcium pantothenate (per kg. body weight daily) to a basal vitamin B deficient diet did not usually permit of optimum growth in newly weaned puppies. Growth could be restored by the addition of an acid ether residue of a liver extract. Attempts to identify the missing factor or factors have so far been unsuccessful; mixtures of inositol, *p*-aminobenzoic acid, and glutamine have proved inactive.—ALASTAIR N. WORDEN.

SCHAEFER, A. E., MCKIBBIN, J. M., & ELVEHJEM, C. A. (1942). **Pantothenic Acid Deficiency Studies in Dogs.**—*J. biol. Chem.* **143.** 321–330.

Pantothenic acid deficiency was produced in both newly weaned puppies and adult dogs by feeding a basal vitamin B deficient diet supplemented by vitamins B_1, B_6, riboflavin, nicotinic acid, and choline. By further supplementing with varying levels of calcium pantothenate, it was estimated that the daily requirements of the puppy for this vitamin (as calcium pantothenate) was about 100 μg. per kg. body weight.

The clinical, biochemical, and pathological changes which accompanied pantothenic acid deficiency are discussed in some detail. They include:—sudden onset; distressing cardiac, respiratory, intestinal and skeletal muscular symptoms; hypoglycaemia, elevation of the blood non-protein-nitrogen, and a fall in the blood chloride level; fatty liver, haemorrhagic kidneys, mottled thymuses, and, in some cases, inflammation of the stomach and intestines, with intussusception as quite a common occurrence.—ALASTAIR N. WORDEN.

GILLIS, M. B., HEUSER, G. F., & NORRIS, L. C. (1942). **The Need for Pantothenic Acid and an Unidentified Factor in Reproduction in the Domestic Fowl.**—*J. Nutrit.* **23.** 153–163.

Contrary to the findings of LEPKOVSKY *et al.* (1938) the authors present figures indicating that pantothenic acid is necessary for hatchability. Addition of pantothenic acid to a heated basal diet shown to be deficient in the antidermatosis vitamin, increased hatchability from zero to 10–30%. Combination of pantothenic acid and a liver extract increased hatchability to 50–60%. From this it is concluded that an additional unidentified factor necessary for hatchability is present in the liver extract. This factor had no effect except in the presence of pantothenic acid.

The hatchability of the eggs of hens maintained on a normal ration under similar conditions was approximately 72%. Of the hens maintained on the deficient diet about 80% developed a mild dermatosis on the feet and lower shanks. No lesions developed about the eyes and mandibles. Pantothenic acid both prevented and cured dermatosis of hens.—F. D. ASPLIN.

HEGSTED, D. M., MILLS, R. C., BRIGGS, G. M., ELVEHJEM, C. A., & HART, E. B. (1942). **Biotin in Chick Nutrition.**—*J. Nutrit.* **23.** 175–179.

Young chicks fed a simplified basal ration developed a dermatitis which was prevented by supplements of biotin concentrates and by free crystalline biotin.

The biotin content of the liver and kidneys of chicks receiving adequate biotin was four times greater than that of chicks on the basal ration alone. The results indicate that the chick requires 10 μg. of biotin per 100 g. of feed in addition to that present in the basal ration.—F. D. ASPLIN.

PHYSOLOGY

GILMORE, L. O., PETERSON, W. E., & RASMUSSEN, A. T. (1941). **Some Morphological and Functional Relationships of the Bovine Hypophysis.**—*Tech. Bull. Minn. agric. Exp. Sta.* No. 145. pp. 55.

On account of the importance of the pituitary gland to lactation and general sexual activity, large-scale experiments were carried out to determine the limits of normal variability in the gland in cattle at the various stages of development, with particular reference to the anterior lobe. The weight was found to vary proportionately with body weight, although the increase in size is relatively slower. In freemartins the gland tends to be smaller than in normal females. No relationship appears to exist between weight and productional ability. The size of the anterior lobe is greatly in excess of the rest of the gland; differences in proportional weight of the anterior lobe were found, but whether these were due to inheritance or age could not be determined. Of the usual cells in this lobe, the crimson acidophile appeared to be associated with sexual activity. Although no outstanding point can be drawn from these experiments, the data presented are of great importance.—C. W. OTTAWAY.

RANKIN, R. M. (1941). **Changes in the Content of Iodine Compounds and in the Histological Structure of the Thyroid Gland of the Pig during Fetal life.**—*Anat. Rec.* **80.** 123–135.

The thyroid glands were collected from a series of foetal pigs, and were analysed for total iodine, thyroxine iodine, and inorganic (water-soluble) iodine; the diiodotyrosine iodine was calculated by difference. Sections of some of the glands were examined histologically.

Traces of inorganic iodine were detected in some foetuses as young as the 7 cm. crown-rump length stage, *i.e.* about 46 days. At this stage the histology of the gland appeared identical with that of younger (5·5 cm.) foetuses. Thyroxine iodine was first demonstrated in 8–9 cm. (about 52 day) foetuses, and at this time there was a marked increase in the vascularity of the gland. The typical histological features of an adult gland, *i.e.* acini and thyroid colloid, were not detected until some days later (12 cm. foetuses, or about 60 days), by which time appreciable quantities of organic iodine were present.

Glands collected during autumn had a higher total iodine content than had those of a corresponding age collected in spring.—ALASTAIR N. WORDEN.

BROWN, G. L., MILES, J. A. R., VAUGHAN, J. M., & WHITBY, L. E. H. (1942). **The Effect of Haemorrhage upon Red Cell Size and Red Cell Distribution.**—*Brit. med. J.* Jan. 24th. 99–102.

Observations made on human subjects, cats, and rabbits showed that varying small increases in red cell size occur after haemorrhage. It is probable that these changes are of no physiological significance but should be taken into account in haematocrit estimations for following changes in blood volume. There was no evidence for the immobilization of swollen cells in muscle capillaries nor their mobilization by plasma transfusion as described by BRENNAN (1940). Haemodilution was found to be complete in about 24 hours in normal subjects after haemorrhage, but it may take 3–4 days after surgical operation.—J. P. GARDNER.

I. BLAIR, G. W. S., FOLLEY, S. J., MALPRESS, F. H., & COPPEN, F. M. V. (1941). **Variations in Certain Properties of Bovine Cervical Mucus during the Oestrous Cycle.**—*Biochem. J.* **35.** 1039–1049.

II. BLAIR, G. W. S., COWIE, A. T., & COPPEN, F. M. V. (1942). **Rheological Properties of Secretions from the Cervix of Pregnant and Non-Pregnant Cows. [Correspondence].**—*Nature, Lond.* **149.** 609–610.

I. The work described in this paper forms part of a study of the chemical and rheological properties of bovine cervical mucus in different phases of the reproductive cycle, undertaken with a view to developing the mucin test into an objective test for early pregnancy in the cow. Variations in total N, dry matter, viscosity and flow-elasticity of the cervical mucus were studied during the oestrous cycle. Total N, dry matter, and viscosity reached minimum values at about the time of oestrus; flow-elasticity showed a marked maximum. The total N content of the dry matter at oestrus had a value of 1–2% while in mid-cycle it rose to 6–10%. The authors consider that this variation is great enough to serve as the basis of a test for the diagnosis of oestrus. The secretions are not true fluids, but the authors described a method whereby a viscosity value can be determined under arbitrarily standardized conditions. This value could serve as the basis for a test of oestrus were it not for the fact that various factors, especially comparatively slight contamination of the mucus samples with urine, seriously influence the results. A more reliable test than viscosity value and a simpler method than total N determination is the determination of the flow-elasticity of the mucus. The authors describe a simple apparatus (oestroscope) for carrying out this test and state that the chances of a false diagnosis of oestrus by this means are small [see also *V. B.* **12.** 427].

II. A preliminary note reporting apparently significant differences in the flow-curves for the cervical secretions of 27 pregnant and 23 non-pregnant cows, tested in an emptying tube viscometer. The difference in pregnant cows is probably due to the presence of a corpus luteum in the ovary. The authors propose to investigate the flow-curves for anoestrus due to retained corpus luteum.—N. J. SCORGIE.

ROTH, S. Y., MAYER, D. T., & BOGART, R. (1941). **Pregnancy Diagnosis in Swine by a Chemical Test.**—*Amer. J. vet. Res.* **2.** 436–438.

Precise details are given of a modification of the Cuboni test [see HELLER—*V. B.* **11.** 562.], which is said to have given very satisfactory results in the diagnosis of pregnancy in Hampshire and Duroc-Jersey sows. An acid hydrolysate of filtered urine (which has been treated with zinc sulphate and caustic soda) is extracted with benzene or another suitable solvent, and the solvent extract treated with sulphuric acid and heated to 60°–70°C. until it is nearly colourless. After thorough cooling for at least 30 min., positive samples exhibit a green fluorescence in reflected light, whereas negative samples give a brownish coloration. Positive samples are confirmed after being allowed to stand for 12 hours and then having distilled water added.

The test is applicable from the 21st to 32nd days only, since oestrogen excretion drops rapidly thereafter and does not rise again until nearly the 80th day of pregnancy. Accurate breeding records are therefore essential for the test to be of practical value.—A. N. W.

SCHAFFER, N. K., DILL, L. V., & STANDER, H. J. (1941). **The Effect of Renin on the Uric Acid Metabolism of the Pregnant and Non-Pregnant Dalmatian Dog.**—*Endocrinology.* **29.** 243–249.

Estimations were made of the uric acid content of the blood and urine of Dalmatian bitches, and of one

Dalmatian dog, in which the blood pressure had been raised either by injections of renin (prepared from pig's kidney) or by partial constriction of the renal arteries. Repeated injections of renin produced a continuous rise in the daily uric acid excretion, which was almost doubled, and temporary elevations of the blood uric acid level. A slight hyperglycaemia and a small rise in blood urea resulted from renin injections in both pregnant and non-pregnant bitches.

A marked elevation of the blood uric acid and a sustained hyperglycaemia developed in a pregnant bitch in which hypertension had been produced by arterial ligation.

[The animals employed in these experiments were "high uric acid producers". The criterion of high uric acid production was that the uric acid N to creatinine N ratio of a random sample of urine was 0·5 : 1 or greater.]—ALASTAIR N. WORDEN.

VENZKE, W. G. (1941). **The Response of the Gonads of Chick Embryos to Gonadogen.**—*Amer. J. vet. Res.* **2.** 281–284.

Injections of gonadogen in doses of 5–30 rat units into the developing chick embryo resulted in hyperplasia of the gonads of both sexes. The changes were most marked in the intertubular tissue of the testis and the medulla of the ovary.

There was no measurable response of the head furnishings of either sex.—F. D. ASPLIN.

POISONS AND POISONING

COOP, I. E. (1940). **Cyanogenesis in White Clover (Trifolium repens L.). III. A Study of Linamarase, the Enzyme which Hydrolyses Lotaustralin.**—*N.Z. J. Sci. Tech.* **22.** 71B–83B. [For previous parts, see *V. B.* **12.** 122].

MELVILLE, J., COOP, I. E., DOAK, B. W., & REIFER, I. (1940). **Cyanogenesis in White Clover (Trifolium repens L.). IV. Methods of Determination and General Considerations.**—*Ibid.* 144B–154B.

III. In the toxicological study of a plant containing a cyanogenetic glucoside, it is essential to consider in addition to the concentration of the glucoside, the concentration and mode of action of the enzyme which brings about the hydrolysis with the liberation of hydrocyanic acid.

The cyanogenetic glucoside of white clover has been shown to be a mixture of about 80% lotaustralin with 20% of the lower homologue linamarin, and the enzyme to be linamarase. Experiments on the preparation of a concentrated enzyme material and on the physico-chemical characteristics of the enzyme-glucoside reaction are recorded. The enzyme was prepared from two sources, linseed and clover leaves, and the report deals mainly with the action of the two preparations on lotaustralin.

IV. Methods for the detection and estimation of hydrocyanic acid in white clover are described and discussed, including a new qualitative test for HCN and methods for the removal of HCN from leaf tissue.

In clover leaves containing both enzyme and glucoside a very rapid breakdown of about 25% of the total glucoside occurs after the leaves are detached from the plant.

Although the proportion of high HCN clover in New Zealand pasture has risen considerably in recent years, no evidence is available indicating toxic effects in animals grazing thereon. It is calculated that sheep grazing on a ryegrass-clover pasture may ingest in 24 hours a quantity of glucoside containing eight lethal doses of HCN. For this reason the better strains of clover appear dangerous, but farming practice in New Zealand demonstrates the inaccuracy of this conclusion. The need for further work on the toxicity of lotaustralin is emphasized.—M. B. BUDDLE.

KENNEDY, T. H., & PURVES, H. D. (1941). **Studies on Experimental Goitre. I : The Effect of Brassica Seed Diets on Rats.**—*Brit. J. exp. Path.* **22.** 241–244.

GRIESBACH, W. E. (1941). **Studies on Experimental Goitre. II : Changes in the Anterior Pituitary of the Rat, Produced by Brassica Seed Diet.**—*Ibid.* 245–248.

GRIESBACH, W. E., KENNEDY, T. H., & PURVES, H. D. (1941). **Studies on Experimental Goitre. III : The Effect of Goitrogenic Diet on Hypophysectomized Rats.**—*Ibid.* 249–254.

I, II, & III. Addition of various *Brassica* seeds (swede, turnip, rape, etc.) to the normal diet of rats produced rapid hyperplasia of the thyroid, so that the weight of the gland was increased by as much as 300%. This rapid proliferation occurred in the second and third weeks of the diet but was not sustained, as after this the only increase in thyroid weight was proportional to increase of body weight. Administration of iodine did not affect the proliferation. The thyroid changes were accompanied by hypertrophy of the adrenal cortex, delay in the development of the ovaries, and histological changes in the pituitary. Examination of the pituitary showed a rapid increase in basophile cells with hyalinization, vacuolation, and the formation of "signet ring" cells with a simultaneous loss of acidophile cells. The thyroids of hypophysectomized rats maintained on the *Brassica* seed diet showed no hyperplasia and hypophysectomy rapidly brought about regression of the changes induced by the diet. From these results it is deduced that the diets act through a thyrotropic hormone from the pituitary.—R. ALLCROFT.

CUNNINGHAM, I. J. (1941). **The Chemistry, Pharmacology, and Toxicology of Ergot (Claviceps purpurea).**—*N.Z. J. Sci. Tech.* **23.** 138A–145A.

Largely a review article, but some new toxicological data are included.—M. B. BUDDLE.

ROBINSON, H. J., & MOLITOR, H. (1942). **Some Toxicological and Pharmacological Properties of Gramicidin, Tyrocidine and Tyrothricin.**—*J. Pharmacol.* **74.** 75–82.

The acute and cumulative toxicity and certain pharmacological properties of tyrothricin, gramicidin and tyrocidine were determined on mice, rats, dogs, and in the isolated rabbit's intestine and frog's heart. The results showed that on parenteral administration all three substances were toxic, gramicidin and tyrothricin much more so than tyrocidine, but none of the compounds was toxic when given by mouth. Daily parenteral administration of 2 mg. per kg. of gramicidin or tyrothricin to dogs caused death within 2–8 days. Marked leucocytosis and anaemia developed in some cases. Tyrocidine produced greater pharmacological changes in isolated organs as well as *in situ* than did tyrothricin or gramicidin. None of the compounds had a pronounced specific effect on the respiratory or circulatory system, but repeated administration of toxic doses caused degenerative changes in almost all internal organs and caused marked changes in the blood picture.

0·5% suspensions of gramicidin or tyrothricin in saline caused no irritation when instilled into the conjunctival sacs of rabbits, but application of the dried material produced marked conjunctival irritation and a cloudiness of the cornea. Subcutaneous or intradermal injections produced local nodules which remained unabsorbed for 5–6 weeks.—R. ALLCROFT.

ROBINSON, H. J., & WAKSMAN, S. A. (1942). **Studies on the Toxicity of Actinomycin.**—*J. Pharmacol.* **74.** 25–32.

Further data are given on the toxic effects and bactericidal properties of actinomycin, confirming the results already reported [see *V. B.* **12.** 243]. Actinomycin gave no protection to mice infected with *Streptococcus haemolyticus* or *Pneumococcus* type I, but gave slight protection when injected intraperitoneally into mice infected with *Trypanosoma equiperdum*.—R. A.

DICKINSON, W. A. (1942). **Haemolytic Anaemia in a Mare due to Sulphanilamide.**—*Vet. Rec.* **54.** 224.

A mare which had just given birth to a dead foal was given a total of 6 oz. of sulphanilamide, 3 oz. being given immediately after foaling, two 1 oz. doses the next day, and a single 1 oz. dose on the third day. She died during the evening of the third day. Her symptoms were :- laboured respiration, weak and irregular pulse, temperature 102°F., yellow mucous membranes, mild haemoglobinuria, and reddish fluid trickling from the nostrils. No autopsy was made but it is considered that the animal died from acute haemolytic anaemia due to sulphanilamide. It is apparently the first case of its kind to be reported in a domestic animal, and D. asks for other cases, if they exist, to be put on record.

[There are now numerous reports of haemolytic anaemia being produced in human beings by the sulphanilamide group of drugs.]—D. G. DAVEY.

THERAPEUTICS

TRIPP, L. H., & LAWRENCE, C. A. (1942). **Clinical Observations on Use of Gramicidin in the Treatment of Bovine Mastitis.**—*Cornell Vet.* **32.** 90–95.

Twenty-five infected quarters of 20 cows were treated with gramicidin by injecting 43 ml. of a gramicidin-oil emulsion (containing 160 mg. gramicidin) into the cistern where it was left for approximately 12 hours. Of 15 quarters definitely known to be infected with *Streptococcus agalactiae*, the organisms were eliminated from 14, while two of three quarters containing mixed cultures of β-haemolytic and non-haemolytic streptococci, and three of four quarters where the organisms were not identified, were cured. Two quarters infected with β-haemolytic streptococci and one with *Staphylococcus aureus* failed to respond to gramicidin treatment, but subsequent treatment with sodium sulphathiazole effected a cure in one case of β-haemolytic streptococcal infection. In all cases only a slight reaction of the udder tissues was observed. Protocols are given of each case. —R. ALLCROFT.

WAKSMAN, S. A., & WOODRUFF, H. B. (1942). **Streptothricin, a New Selective Bacteriostatic and Bactericidal Agent, Particularly Active Against Gram-Negative Bacteria.**—*Proc. Soc. exp. Biol., N.Y.* **49.** 207–210.

A new antibacterial substance called streptothricin has been obtained from a soil *Actinomyces* which is similar to *A. lavendulae*. The substance appears to be formed from certain amino acids in the medium and iron seems to be essential to its formation. It is readily soluble in water and dilute mineral acids, but is insoluble in ether, petroleum ether, and chloroform. It is best prepared from the medium by adsorption on charcoal (norit A), followed by elution with dilute mineral acid and further concentration by neutralization of the acid and concentration *in vacuo* at 50°C. to dryness. The properties of the substance appear to be those of an organic base and it is not affected by proteolytic enzymes and can withstand 100°C. for 15 min.

Streptothricin is highly active *in vitro* even in crude preparations against various Gram-negative and Gram-positive organisms in concentrations of 0·1 mg. crude material per 10 ml. agar. In higher concentrations it is strongly bactericidal for various Gram-negative bacteria. Among the organisms on which it exerts a bacteriostatic action are *Bacterium coli, Pasteurella pseudotuberculosis, Salmonella gallinarum, S. cholerae-suis, S. abortus-equi, S. typhi-murium, Haemophilus suis, H. influenzae, Brucella abortus*, and *Mycobacterium phlei*.—R. A.

WIESNER, B. P. (1942). **Bactericidal Effects of *Aspergillus clavatus*. [Correspondence].**—*Nature, Lond.* **149.** 356–357.

A brief account is given of an antibacterial substance obtained from *A. clavatus* when grown in a simple liquid medium such as Csapek Dox solution. The growth of *Staphylococcus aureus* was inhibited in glucose broth and other media when small portions of the culture medium of *A. clavatus* were added; larger quantities were bactericidal and with intermediate dilutions an initial phase of bacteriostasis may be followed by bactericidal action. Concentrates of the active substance were obtained from the liquid medium by adsorption on charcoal and subsequent elution with ether. Dilutions of 10^{-5} of this ether-soluble fraction were bactericidal, and antibacterial activity was demonstrable in presence of serum, pus, and urine. No toxic effects were observed when the substance was administered to mice, healthy human subjects, and to a number of clinical cases. It differs from penicillin by being bactericidal as well as bacteriostatic, relatively stable, and inhibits the growth of, and in higher concentrations kills, a number of organisms which are not attacked by penicillin.—R. ALLCROFT.

NETER, E. (1942). **Effects of Tyrothricin and Actinomycin A upon Bacterial Fibrinolysis and Plasma-Coagulation.**—*Proc. Soc. exp. Biol., N.Y.* **49.** 163–167.

From the tabulated results it appears that fibrinolysis by *Streptococcus haemolyticus* (group A Lancefield) was prevented by tyrothricin and actinomycin A at concentrations of 0·01–0·001 mg. and 0·0005–0·00005 mg. respectively. Also coagulation of plasma by *Staphylococcus aureus haemolyticus* was prevented by 0·01–0·0001 mg. tyrothricin and 0·0005 mg. actinomycin A after an incubation period of 90 min.—R. ALLCROFT.

RAMMELKAMP, C. H. (1942). **Observations on Resistance of *Staphylococcus aureus* to Action of Tyrothricin.** —*Proc. Soc. exp. Biol., N.Y.* **49.** 346–350.

The variation in their susceptibility to the action of tyrothricin was determined *in vitro* on 19 strains of *Staph. aureus*. The majority of strains was killed by concentrations of 0·2 mg. of tyrothricin per ml., but two strains required 0·4 and 0·8 mg. per ml. respectively. The resistance of the staphylococci to tyrothricin was increased markedly by growing the organisms in increasing concentrations of the antibacterial substance. The results show that there is roughly a tenfold difference in the concentration of tyrothricin necessary to inhibit the growth of, or to kill various strains of

Staph. aureus. The variation in susceptibility is believed to be a factor in determining the successful sterilization of local lesions treated with tyrothricin. Details are given of the marked increase in the resistance of a strain of *Staph. aureus* to tyrothricin which developed in one case after several weeks of therapy.—R. ALLCROFT.

I. ABRAHAM, E. P., & CHAIN, E. (1942). **Purification of Penicillin. [Correspondence].**—*Nature, Lond.* **149.** 328.

II. ABRAHAM, E. P., BAKER, W., CHAIN, E., FLOREY, H. W., HOLIDAY, E. R., & ROBINSON, R. (1942). **Nitrogenous Character of Penicillin. [Correspondence].**—*Ibid.* 356.

III. FLEMING, A. (1942). **In vitro Tests of Penicillin Potency.**—*Lancet.* **242.** 732–733.

IV. POWELL, H. M., & JAMIESON, W. A. (1942). **Response of Sulfonamide-fast Pneumococci to Penicillin.**—*Proc. Soc. exp. Biol., N.Y.* **49.** 387–389.

I. A short note on the preparation of penicillin as a highly purified barium salt which, although not crystalline, completely inhibited the growth of *Staphylococcus aureus* in broth at a dilution of 1 : 25,000,000.

II. Analyses of the purified Ba salt of penicillin, which is strongly laevorotatory in aqueous solution, indicate a provisional formula of $C_{24}H_{32}O_{16}N_2Ba$.

III. Methods are described for testing the bacteriostatic power of mould cultures or other antibacterial substances. The mould is grown in a streak across one side of a culture plate and at suitable intervals test bacteria are streaked across the plate. If penicillin is produced there is an area of inhibition round the mould growth varying with the intensity of penicillin production. The gutter or impregnated strip method in which a gutter is filled with agar containing penicillin is useful when many bacteria have to be tested against one mould culture; the hole or agar cup method, in which holes are cut in culture plates of agar with a cork borer and 2–3 drops of penicillin solution are placed in the holes, is a useful method for testing many mould cultures against one organism. When the titration method is used it is suggested that a constant inoculum of the same organism should be used in a constant medium and the end-point should be a colour change due to the production of acid. *Staphylococcus aureus* is a convenient test organism, but constant results can only be achieved by using a specific strain.

IV. A preliminary report is given of the effect of penicillin on both parent and sulphonamide-fast pneumococci in mouse infection experiments. A group of 240 mice were each injected with about 10,000 M.L.D. of the various subcultures of pneumococci together with a group of 144 untreated controls which were used to determine the virulence of the different strains. Penicillin was given in ten oral doses of 20 mg. each and sulphapyridine therapy comprised five oral doses of 30 mg. each. The results show that sulphapyridine was decreasingly effective against the parent strains of types I, II, and III, and types I, II, and III of the sulphapyridine-fast strains; the degree of effectiveness against the last three strains was practically nil. In contrast penicillin was highly effective against both parent and fast strains of types I and II and moderately effective against parent and fast strains of type III pneumococci.—R. ALLCROFT.

DUBOS, R. J. (1941). **Bacteriostatic and Bactericidal Agents Obtained from Saprophytic Microorganisms.**—*J. Pediat.* **19.** 588–595.

Antibacterial agents derived from some saprophytic micro-organisms are very briefly discussed; the extraction from *Bacillus brevis* of tyrothricin, gramicidin, and tyrocidine hydrochloride are dealt with at greater length. The properties and results of some clinical trials of the last three antibacterial agents are briefly described. No new information is given beyond that recorded in *V. B.* **12.** R1–R6.—R. ALLCROFT.

CAMERON, H. S. (1942). **Field Investigations on Sulfaguanidine in Swine Enteritis.**—*Cornell Vet.* **32.** 1–10.

Sulphaguanidine in doses of 1–2 g. per 20 lb. body weight four times daily was administered orally in gelatin capsules to pigs in three different herds affected with enteritis. The results indicate that this drug has a definite beneficial effect, but it appears desirable to maintain animals on a minimum dosage for several days following recovery as relapses often occurred 6–8 days after treatment was discontinued. C. also considers that the pigs' having access to an unlimited amount of food, with resultant overeating, plays a part in the aetiology of the disease, particularly in weaner pigs, and that lowering the food intake has a distinct influence on the termination of an outbreak in a herd.
—R. ALLCROFT.

SCHLENKER, F. S., DELAPLANE, J. P., & STUART, H. O. (1941). **The Chemotherapy of Infectious Coryza with Sulfathiazole: Correlation Between Feeding Levels and Blood Concentrations.**—*Amer. J. vet. Res.* **2.** 443–446.

A maximum blood level of sulphathiazole is attained 1½–3 hours after administration, a rapid drop then occurs, after which the drug gradually disappears from the blood within some time after 30 hours.

Preliminary feeding experiments indicated that birds inoculated intranasally with *Haemophilus gallinarum* showed no symptoms when fed mash containing 1, ½, ¼, and ⅛ g. of sulphathiazole per oz. of food, but subclinical symptoms developed when the sulphathiazole was reduced to ⅛ g. per oz.

Cockerels given access to a morning mash containing ⅛ g. per oz. had a maximum blood concentration of sulphathiazole during the late afternoon; this fell to a minimum just before the first morning feed. Environmental factors such as length of day, atmospheric temperature, and sulphathiazole level in the feed play an important part in determining the slope of this curve.—F. D. ASPLIN.

STEINBACH, M. M., & DUCA, C. J. (1942). **Promin in Treatment of Experimental Tuberculosis.**—*Proc. Soc. exp. Biol., N.Y.* **49.** 460–464.

Four experiments with two strains of human tubercle bacilli showed that addition of 40 mg.% promin [see WINSHAW *et al.*—*V. B.* **12.** 430.] to Sauton's medium inhibited the growth of the bacilli for about 30 days but there was no change in the morphology, staining reactions, or virulence of the organisms after this period. *In vivo* experiments on g. pigs artificially infected with TB. showed that subcutaneous administration of 140–160 mg. promin in 40% aqueous solution three times daily exerted a definite retardation on the spread and multiplication of tubercle bacilli in the animals but did not cure the disease. In about 50% of the cases ulcers occurred at the site of injection of the promin but healed within 2–3 weeks without secondary infection; in seven out of 20 treated animals and in one control animal, varying degrees of fatty degeneration of the liver were observed.—R. ALLCROFT.

WERDELIN, C. (1940). Er de klorholdige Desinfektionsmidler anvendelige overfor Tuberkelbakterier? **[Value of Chlorine Disinfectants against Tubercle**

Bacilli].—*Beretn. 5. nord. Vet.-mode, Kbh., 1939.* pp. 136–154. [German summary].

The lethal action of chlorine compounds upon dried bovine tubercle was found to depend upon the amount of hypochlorous acid liberated, and this bears no relation to the phenol coefficient or active Cl content of the material. As the liberation of hypochlorous acid depends upon many factors, such as pH, organic matter present, and other factors not readily controlled, W. does not regard these substances as of practical value. —J. G. CARR.

ROMO, R. R. (1942). **The Relative Efficiency of the More Commonly Recommended Disinfectants on Brucella Abortus.**—*Thesis, Cornell.* pp. 42.

An attempt to evaluate the comparative germicidal properties of certain of the more commonly used disinfectants when applied to *Br. abortus*. The technique outlined by RUEHLE & BREWER [circular no. 198, "United States Food and Drug Administration Methods of Testing Antiseptics and Disinfectants"] was employed. The disinfectants were tested with and without the presence of organic matter (yeast).

Commercial superphosphate which is used extensively as a fertilizer, and calcium hydroxide (slaked lime) were ineffective in killing *Br. abortus*. Lye was least affected when used in the presence of organic matter. Dilutions of 1 : 750 killed two strains of the organism in 10 min., but not in 5 min., when used in the presence of a 20% yeast suspension. A 2% solution is recommended for byre disinfection. "Sterilac" caused varying degrees of inhibition of growth of the organisms.

Liquor cresolis compositus was effective even in the presence of organic matter, but is not recommended for byre disinfection because of the odour. Cresylic acid was also effective but likewise has an objectionable odour. Sodium orthophenylphenate was effective in the presence of organic matter when used in a dilution of 1 : 55. It is recommended because it is odourless and not poisonous; it is best applied hot. Carbolic acid was highly efficient in a dilution of 1 : 60 in the presence of organic matter, but its cost limits its use. Also, it has the great disadvantage of being toxic for man and animals in dilutions stronger than 2%.—H. L. GILMAN.

I. MCILWAIN, H. (1941). **A Nutritional Investigation of the Antibacterial Action of Acriflavine.**—*Biochem. J.* **35.** 1311–1319.

II. MCILWAIN, H. (1942). **Interpretation of Chemotherapy through Nutritional Studies.**—*Lancet.* **242.** 412–415.

I. *Bacterium coli* and *Streptococcus haemolyticus* were grown in simple media (their composition is given) which were just adequate for fair growth. Experiments were then made to determine what substances would reverse the inhibitory effect of acriflavine on the growth of the organisms in such media, with the finding that nucleotides (type I compounds) and concentrates of amino acids (type II compounds) would do so. The activity of the latter was enhanced in the presence of hydrogen-carrier systems such as methylene blue. It is considered that acriflavine inactivates enzyme systems of which type I compounds are essential parts, of which type II compounds are substrates or products, and of which some can be replaced by the hydrogen carriers.

II. In this resumé of the biochemical approach to the interpretation of the mechanism of chemotherapeutic action, M. emphasizes the valuable contributions made by fundamental studies of the nutritional requirements of organisms. Such studies indicate that the activity of many chemotherapeutic substances can be visualized as an interference with particular cellular enzyme systems. Since enzymes are so often specific this may explain much of the specificity of chemotherapeutic substances. The account is illustrated by a discussion of many examples, including the inhibition of sulphonamide compounds by *p*-aminobenzoic acid, and of acriflavine by nucleotides and hydrogen transporting systems. The theory is naturally vague as yet, but it should provide many lines to be profitably followed in future research.—D. G. DAVEY.

*WELDI, P. (1941). Versuche zur Behandlung der Windpocken mit Albucidsalbe. [**Treatment of Teat Pox in Cattle with Albucid Ointment**].—*Inaug. Diss., Berlin.* pp. 21. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 98].

Windpocken is defined as a papular exanthema of cows' teats, which may be differentiated from genuine cow pox and is not transmissible to man. It runs a mild course. "Albucid" ointment (containing a sulphanilamide derivative) was used on 50 cases in cattle (with controls) and appeared to shorten the clinical course in early cases.

KIKUTH, W., & SCHMIDT, H. (1941). Chemotherapeutische Untersuchungen mit Neostibosan und Solustibosan bei mit Leishmanien infizierten Hamstern. [**Chemotherapeutic Tests with Neostibosan and Solustibosan in *Leishmania*-Infected Hamsters**]. —*Z. ImmunForsch.* **100.** 157–178.

Daily injections of 500 mg. per kg. body weight neostibosan or solustibosan, over ten consecutive days, cured *Leishmania*-infected hamsters within two weeks in the majority of cases. Animals receiving 500 mg. per kg. solustibosan or neostibosan twice each week were also cured. Prolonged treatment over several weeks produced no better therapeutic results than the more concentrated treatment.—C. HORTON SMITH.

*SOLDATI, D. (1941). Un metodo efficace per la cura delle piroplasmosi dei bovini (pisciasangue). [**Treatment of Bovine Piroplasmosis**].—*Clin. vet., Milano.* **64.** 99–101. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 46].

S. claims complete recovery following injections of calcium gluconate (300 ml. of 20% solution intravenously) supported by caffeine and digitalis or strophanthus.

*SEEK, P., & SCHUMACHER, W. (1941). Ein Beitrag zur Bekämpfung der Coccidiose. [**Control of Rabbit Coccidiosis**].—*Arch. Kleintierzucht.* **2.** 57–66. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 45].

In work on chemical control of coccidial oocysts, the authors found that the inner wall of the oocyst consists of a fatty substance. It is stated that a proprietary preparation "eimeran" was found to penetrate this and to be effective as a lethal agent.

GALLO, P., & LORETO, F. DE A. (1940). Ulteriores ensayos con la "Atebrina" intravenosa en la coccidiosis de los conejos. [**Trials with Atebrin in Rabbit Coccidiosis**].—*Rev. Med. vet. Parasit., Caracas.* **2.** Nos. 1/2. 99–101.

The authors kept coccidia-infected, pregnant does in uncleaned cages until the birth of their young. At 12–15 days old, half of the young rabbits were given three intravenous injections of 0·5 ml. atebrin in a 1 : 1,000 solution, while the other half were left untreated to act as controls. None of the treated rabbits died although there was a 90% mortality among the controls. Infected rabbits 1–2 months old were treated by giving 1 ml. of the same solution on four successive days. All the treated animals recovered. Artificially infected

rabbits were treated in the same way with equally good results.—Miller Watson.

I. Goff, O. E. (1942). **Flowers of Sulfur and Charcoal in the Prevention of Experimentally Produced Coccidiosis.**—*Poult. Sci.* **21.** 23–29.

II. Goff, O. E. (1942). **Period of Protection Afforded by Sulphur in Prevention of *Eimeria Tenella* Infections.**—*Ibid.* 155–160.

I. The coccidiostatic effect in chickens, aged two weeks and over, of a ration containing 5% flowers of sulphur is increased with the addition of 5% oakwood charcoal. These experiments show that if 5% charcoal is present, the coccidiostatic value of a 2% flowers of sulphur ration is that of a 5% sulphur ration. Month-old and older chickens were found to suffer no ill effects from a 5% sulphur ration when fed over a period of two weeks.

II. Previous experiments by G. [see I] showed that sulphur, or sulphur with charcoal, protected chickens from experimental coccidiosis. The present experiments showed that rations including 5% of no. 10 hardwood charcoal with 2–5% flowers of sulphur, or 5% sulphur alone, fed for one day before inoculation with oocysts of *E. tenella* offered the same protection to the birds as they did when fed for five days before inoculation; this observation indicates that it is probably the sporozoite stage which is primarily affected by flowers of sulphur. The preventive action of sulphur and of sulphur and charcoal existed only while they remained in the intestine. Birds were highly susceptible to *E. tenella* 24 hours after the normal untreated ration had been resumed. G. considers that sulphur feeding is an aid to, and not a substitute for, sanitation.—C. Horton Smith.

Eagleson, C. (1941). **Bioassay of Livestock Spray Using Hypnotic Doses Applied in a Spray Tunnel.**—*Soap.* **17.** No. 5. 101–107.

Since flies recover more rapidly from pyrethrum poisoning when they are fanned by gentle currents of air than when conditions permit even mild fumigation, as in solid-bottom recovery cages, the usual Peet-Grady method for household sprays is unsatisfactory for evaluating sprays to be used in well-aired barns and sheds. A more advantageous and satisfactory method of assaying livestock sprays is described. It consists of applying hypnotic doses to houseflies in an aerated spray tunnel, and making observations of torpor during their recovery in an aerated recovery cabinet.—W. Moore.

Simmons, S. W. (1941). **Removal of *Gasterophilus* Eggs from Horse Hair.**—*J. econ. Ent.* **34.** 116–117.

Egg shells of *G. nasalis* and *G. intestinalis* are not normally detached from horse hair during commercial processing. Immersion of the hair in 0·5% aqueous solution of trypsin was found to hydrolyse the egg cement without injuring the hair. 6–7 hours' immersion is necessary at 38°C.; with weaker solutions than 0·5%, longer time is required. The possibility of adapting the method for use on living animals was not investigated.—J. MacLeod.

Grahame, T., Sloan, J. E. N., & Morris, P. G. D. (1942). **Observations on Phenothiazine as an Anthelmintic in Horses and with Reference to Blood Examination.**—*Vet. Rec.* **54.** 213–214.

A detailed account is given of the effect of phenothiazine, in single doses of 25–35 g., on the worm burden of four horses, and on the blood picture of two of the treated animals. Each horse, before treatment, harboured many thousands of small strongyles (mainly *Trichonema* spp.), virtually all of which were removed by the drug. The numbers of other species present (*Strongylus* spp., *Oxyuris equi*, *Parascaris equorum*) were too small to warrant definite conclusions, although indications were obtained that the drug was moderately effective against immature *Oxyuris*. The blood examinations showed nothing of significance.—D. G. Davey.

Holman, H. H., & Pattison, I. H. (1942). **Observations on the Blood-Picture of Sheep Treated with Phenothiazine.**—*Vet. Rec.* **54.** 215–216.

About 30 lambs, which showed an average egg count of 1,000 eggs per g. of faeces, were given phenothiazine in amounts ranging from 5–160 g. None of the treated animals exhibited any significant changes in the blood picture.—D. G. Davey.

Schmid, F. (1942). Phenothiazin als Wurmmittel. [**Phenothiazine as an Anthelmintic**].—*Dtsch. tierärztl. Wschr.* **50.** 26–28.

Phenothiazine, given to chickens in doses of 0·5 g., was highly efficient in eliminating *Capillaria* from the intestine. S. also observed some anthelmintic effect in sheep with doses as low as 2 g. Larger doses could not be used, because of the difficulty experienced in obtaining supplies of the drug.—D. G. Davey.

Larue, A. (1942). Traitement des plaies par les ferments lactiques (Thermobacterium helveticum). [**Treatment of Wounds by Lactic Ferments** (*T. helveticum*)].—*Schweiz. Arch. Tierheilk.* **84.** 136–143. [In French].

Treatment of suppurative wounds in dogs and cats was carried out by the local application of two preparations obtained from *T. helveticum*, viz, (a) *thermobactérine*, consisting of the whole culture and (b) *thermobactérine* T, a "tyndallized" filtrate of whole culture. Prompt cures are stated to have resulted. The mode of action is believed to depend chiefly on two factors—the acidity and the diastases (with vitamin B_2) produced by the thermobacteria.—N. J. Scorgie.

Loofbourow, J. R., Webb, A. M., & Abramowitz, R. K. (1942). **Relation of Aeration to the Activity of Proliferation-Promoting Factors from Injured Cells. [Correspondence].**—*Nature, Lond.* **149.** 272–273.

The necessity of aeration for growth of the wound hormone preparations [see *V. B.* **12.** 296.] is shown. The results indicate that the wound hormone activity of products from injured cells is due to a factor or factors involved in the respiratory mechanism of the cells.—R. Allcroft.

I. Baker, Z., Harrison, R. W., Miller, B. F., & Wexler, R. (1941). **The Bactericidal Action of Synthetic Detergents.**—*J. exp. Med.* **74.** 611–620.

II. Baker, Z., Harrison, R. W., Miller, B. F., & Wexler, R. (1941). **Inhibition by Phospholipids of the Action of Synthetic Detergents on Bacteria.**—*Ibid.* 621–637.

I. Studies were made of the bactericidal effect of various synthetic detergents, of both the anionic and cationic type, upon four Gram-positive and three Gram-negative organisms. All the cationic detergents studied exerted a marked germicidal action on Gram-positive organisms, but had a lesser effect on the Gram-negative. The anionic detergents, at the concentrations employed, only killed off Gram-positive bacteria, and were less efficient than cationic detergents at similar strengths. Of the eight anionic detergents studied the most active one was tergitol-Y, which was a Na alkyl sulphate derived from a branched-chain secondary alcohol. There was some evidence to indicate that those cationic detergents in which a benzyl grouping had been intro-

duced had greater germicidal qualities. The paper includes a discussion on the correlation between germicidal action and chemical structure and that between germicidal action and bacterial metabolism.

II. The inhibitory effect of certain synthetic detergents upon bacterial metabolism was prevented by certain phospholipids such as lecithin, cephalin, and sphingomyelin, but the phospholipid had to be added to the bacterial suspension before or simultaneously with the detergent; addition afterwards was without effect. The prevention of the inhibitory action of the detergents was also observed when the phospholipid was added initially to the suspension and then thoroughly removed by washing. Other bactericidal compounds, such as those isolated from soil bacteria (gramicidin, etc.), were also inhibited by this action of phospholipid, but the effect on bactericidal Hg compounds was very slight.

The germicidal action of various detergents in the concentrations usually employed was also found to be inhibited in the presence of phospholipids. The action was not confined to phospholipids, as a non-ionizing synthetic detergent was also effective in preventing the inhibition of bacterial metabolism by both cationic and anionic detergents. The mode of action of the germicidal effect of detergents is discussed in the light of these findings; the suggestion that the action is one of surface protein denaturation finds a certain amount of support although the authors do not commit themselves solely to such a view.—ALFRED EDEN.

WITLIN, B. (1942). **Evaluation of Bactericides by Egg Injection Method with Special Reference to Development of Technic.**—*Proc. Soc. exp. Biol., N.Y.* **49.** 27–31.

An attempt to evaluate the potency of bactericides by working out the "toxicity index", which was determined by a comparison of their bactericidal efficiency against *Staphylococcus aureus* with their toxicity for chick embryos. Theoretically, the smaller the "toxicity index", the more efficient the germicide.

A comparative study was made of the various methods of injecting the developing chick embryos. Similar results were obtained when injections were made upon the chorio-allantoic membrane, while inconsistent results were obtained by injections into the albuminous material surrounding the embryo.

It was also shown that embryos could withstand an injection of up to 2·0 ml. of inocula such as saline or distilled water and that 12-day-old chick embryos were more resistant to the toxic effect of bactericides than nine-day-old embryos.—M. H. KYAW.

RUEHLE, G. L. A., & BREWER, C. M. (1941). **The F. D. A. Method. Official Method of U.S. Food and Drug Administration, U.S. Department of Agriculture, and National Assn. of Insecticide and Disinfectant Manufacturers for Determination of Phenol Coefficients of Disinfectants.**—*Blue Book, 1941.* pp. 189–190 and 201. Suppl. to *Soap.* New York: MacNair-Dorland Company.

This paper gives a full account of the technique of the F. D. A. method which is claimed to be superior to the Rideal-Walker method in producing consistent results. The medium employed is better adapted to bacterial growth and the technique is not restricted to the use of one test organism (*Salmonella typhi*) as is the case with the R.W. test. Moreover, the stock suspensions of *S. typhi* and *Staphylococcus aureus*, the organisms principally used in germicidal testing, remain sufficiently constant in their resistance to phenol, when grown in an adjusted medium, to necessitate but one phenol control. In addition to the phenol coefficient, other tests are described for preparations not completely soluble in or miscible with water and for antiseptics.—W. MOORE.

PUBLIC HEALTH

WATERS, F. C. (1942). **Veterinary Inspection of Meat, Meat Foods and Dairy Products Consumed by the Army.**—*J. Amer. vet. med. Ass.* **100.** 301–304.

A general account is given of the veterinary inspection of animal food products for the U.S. Army. New problems arising from the preparation of frozen boneless beef, "defence" hams, and "defence" bacon are discussed.—D. D. OGILVIE.

SCHROEDER. (1942). Ueber Untersuchungsergebnisse bei der Fleischbeschau. **[Some Meat Inspection Findings (in the "General Gouvernement Poland"—An Area of German-Occupied Poland)].**—*Z. Fleisch- u. Milchhyg.* **52.** 122.

S. stresses the great importance of adequate veterinary services in the eastern districts by quoting the findings of the abattoir at Lublin, where in 1941 there were discovered 94 cases of trichinosis in pigs, 267 of swine erysipelas, 87 of swine fever, and 69 of measled pork, whilst 238 cattle were found to be measled. In addition, in 8,421 instances, objections were raised in regard to the conditions in which livestock were kept.

Although some 2,061 bacteriological examinations were made of meat, organisms associated with food poisoning were only discovered in four cases, and it is suggested that the development of systematic meat inspection will reveal a greater proportion of infected cases than is indicated by this low figure obtained under the scheme in operation prior to the war and maintained after the German occupation.

The percentage of TB. in this district is very low.

SCHOOP, G. (1942). Fleischvergifter im Wartheland. **[Meat-Poisoning Organisms in Wartheland (Part of Poland)].**—*Z. Fleisch- u. Milchhyg.* **52.** 111–113.

Over a period of 18 months, 7,201 carcasses were examined bacteriologically, and salmonella, of types *enteritidis, typhi-murium,* and *newport,* found in 3·4%. The distribution was:—*S. enteritidis* in 192 calves, 36 cattle, 3 pigs, and 1 sheep; *S. typhi-murium* in 4 calves, 8 cattle, 1 pig, and 1 sheep, and *S. newport* in one bovine animal.

S. newport was also found as the causal organism of bovine pneumonia. Only a few horses and goats were examined, and no cases of infection were found.

In the majority of cases the infection appeared as a general septicaemia; out of 147 such cases *S. enteritidis* was responsible for 139. In the remaining cases there were local foci in one or more organs to indicate that infection was just beginning or just ending. In nearly 10% of infections due to *S. enteritidis,* the organism was discovered in the liver, and these cases must be regarded as having been continuous excretors of the organism during life.

BOLLE. (1941). Ueber die italienischen Exportschlächtereien und ihre gesundheitspolizeiliche Betreuung. **[Italian Export Abattoirs and Their Hygienic Care].**—*Z. Veterinärk.* **53.** 232–241.

Evidence of the existence of trichinosis in Italy is sparse, though without doubt it exists to a limited degree, cases of infection both in pigs and in human

beings having been recorded during the last 20 years. It is suggested that its spread is limited by the low incidence in swine, by the limited consumption of raw pork and by the fact that the methods of curing employed are lethal to the parasite. Despite the comparative rarity of this disease, a rigorous policy of inspection is advocated. The organization of the veterinary services throughout the country is very briefly dealt with. There are 75 provinces, each being subdivided into 10–70 districts. Each district is supervised by a veterinary surgeon who is responsible to his provincial chief, the headquarters being in Rome. There are, in addition, veterinarians in charge of abattoirs and stationed at places on the frontier and at ports, where inspection of animals and animal products is carried out.

—N. S. Barron.

Fuchs, A. W. (1941). **Disease Outbreaks from Water, Milk, and other Foods in 1939.**—*Publ. Hlth Rep. Wash* **56**. 2277–2284.

A summary and analysis of outbreaks reported in the U.S.A. for the year 1939. " Other foods " were a greater source of disease than were both milk and water combined, the former being responsible for 60% whilst water and milk together were incriminated in 40% of the outbreaks. Water was responsible to a slightly higher extent than milk.

Of the " other foods ", pies and pastries were the most common source of infection, being responsible for 32 outbreaks whilst pork was the agent in only 21 outbreaks. 70% of the reports incriminating " other foods " were received from cities having a population of over 10,000.—H. E. Bywater.

TECHNIQUE AND APPARATUS

Nogués, A. E., & Gazzotti, C. L. (1939). Mamografía. Exploración radiológica mammaria por medios de contraste. Técnica, interpretación, valor diagnóstico. [**Mammography : X-Ray Examination of Milk Ducts by Using Contrast Media**].—*Rev. méd. lat. amer.* **24**. 999–1016. [Abst. in *Dairy Sci. Abstrs.* **3**. 102, copied *verbatim*].

The ramifications of the milk ducts can be studied by injecting colloidal thorium dioxide and then making a radiographic examination.

McKenzie, D. A. (1941). **The Enrichment of Streptococci by Salts of Thallium.**—*Proc. Soc. agric. Bact. 1941.* pp. 45–46.

The pH of the medium as first described [*V. B.* **12**. 67]. was 6·8. This is suitable for culture of *Streptococcus agalactiae*, but *Str. pyogenes* would develop better with an initial pH of 7·2–7·6. The medium has facilitated the isolation of streptococci from pathological material, especially from swabs and faecal specimens from horses.—E. Cotchin.

Davis, J. G., & Rogers, H. J. (1941). **Studies on the Mechanism of Bacterial Discoloration and Haemolysis in Blood Agar.**—*Chem. Indust.* **60**. 485.

The zones surrounding colonies in blood agar are correlated with the respiratory systems of the washed organisms. Green discoloration only occurs when hydrogen peroxide is formed by the resting cells, no such zones being formed under anaerobic conditions. Only colonies giving β-haemolysis under aerobic conditions give a zone of any type under anaerobic conditions.

Hydrogen peroxide produced by the colonies is not destroyed by blood catalase, as the blood peroxidase interferes with such destruction. Cyanide, which preferentially inhibits the peroxidase, reduced or suppressed green zones. Organisms producing any type of zone showed β-haemolysis in the presence of $Na_2S_2O_4$, suggesting that organisms which normally give α, α′ or greening, contain a haemolysin activable by reducing agents.—D. L. Hughes.

Wynne, E. S., Rode, L. J., & Hayward, A. E. (1942). **Mechanism of the Selective Action of Eosin-methylene-blue Agar on the Enteric Group.**—*Stain Tech.* **17**. 11–20.

The mechanism of the differentiation of lactose-fermenting and non-lactose-fermenting organisms on the above medium was investigated. The colour of coliform colonies on this medium appears to depend upon two factors, *viz*, the reaction of the two dyes, eosin and methylene blue, to form a dye compound which is acid or neutral, and the production by the lactose fermenters of a low enough pH to allow the dye compound to be taken up by the individual cells of the colony. Non-lactose fermenters are not coloured as the compound is not taken up in alkaline reaction.

It is suggested that the occasional blue colony forms a high pH causing dissociation of the compound and that the colony becomes stained independently with the methylene blue.—D. L. Hughes.

O'Toole, E. (1942). **Flagella Staining of Anaerobic Bacilli.**—*Stain. Tech.* **17**. 33–40.

Bailey's stain is used, with careful attention to details. The organism is passed through two rapid subcultures in broth containing peptone, meat infusion, and glucose. After centrifugation the organisms are washed in distilled water sterilized by filtration through a Mandler filter at a temperature of 30°–37°C. and a pH of about 6·8, and inoculated upon anaerobic agar slopes. The harvested organisms are incubated at 37°C. for about half-an-hour before staining, to get even distribution. A small drop of suspension is placed on the end of specially prepared slides and allowed to flow slowly over the surface of the slide. It is dried in the incubator without heating. Careful testing showed that the amount of heat required to stain the flagella, when carbol fuchsin was used, was ½–1 min.—D. L. Hughes.

Stahly, G. L., Sesler, C. L., & Brode, W. R. (1942). **A Method for Measuring Bacterial Pigments by the Use of the Spectrophotometer and the Photoelectric Colorimeter.**—*J. Bact.* **43**. 149–154.

This method was evolved in order to standardize the measurement of bacterial pigment produced under given conditions. By means of the spectrophotometer, the absorption spectrum data of extracted pigment are first determined. The amount of pigment in a suspension of the bacteria under investigation can then be found by using a photo-electric colorimeter and two filters. The first filter transmits light waves which are unabsorbed by the bacterial pigment, and gives a reading representing the turbidity absorption. The second filter transmits the light which is affected most by the pigment, and the reading in this case represents turbidity plus pigment absorption. Subtraction of the first reading from the second gives the photometric density due to pigment for a standard turbidity.

—Isobel W. Burton.

MISCELLANEOUS

—. (1939). **New Zealand. The Meat Act, 1939.** pp. 49. Wellington: Govt. Printer. [8vo] [2s.]

—. (1940). **New Zealand. The Meat Regulations 1940.** pp. 21. Wellington: Govt. Printer. [8vo] [1s.]

The Meat Act and the Meat Regulations were enacted "to make better provision for the establishment of abattoirs by local authorities, for the licensing of slaughter-houses, for the inspection of meat intended for human consumption and for the licensing of persons carrying on business as exporters of meat".

The Act orders the establishment of an abattoir by every borough having a population over 2,500, and enforces meat inspection according to modern practice.

EICHHORN, A. (1942). **Personal Survey of Wartime Animal-Disease Control in Great Britain.**—*J. Amer. vet. med. Ass.* **100.** 7–11.

Chosen by the U.S.A. Government in August, 1941, to represent that country as a specialist in animal disease control, E. visited Great Britain in order to discuss with the authorities problems concerning the control of infectious diseases of animals. He attended conferences of committees of the Agricultural Research Council which is giving primary consideration to diseases influencing meat and milk production. Owing to the limitation of imported feeding stuffs, the number of pigs and poultry is greatly reduced, and every effort is being made to maintain the maximum number of milch cows. Nevertheless, the lack of food concentrates has caused a diminished supply of milk, it is estimated that bovine contagious abortion and mastitis together are responsible for a 15% reduction in the milk yield. E. considers that the present state of contagious abortion in the country (35% of the herds are estimated to be now infected) is due to the wide use of live vaccine, which is stated to be responsible for spreading infection. The British Government asked the U.S.A. Government for the services of an officer to help in the inauguration of production of a vaccine from strain 19 of *Br. abortus*. [Dr. C. K. MINGLE visited the United Kingdom for this purpose this year.] The control of mastitis is regarded as being at best largely limited to hygienic and sanitary precautions. E. believes that with the effort of increased milk production and the lack of proper feed, the incidence of bovine TB. will increase and that human infection of the bovine type will unquestionably increase proportionately, especially as pasteurization is only practised to a limited extent. He contrasts this with the position in the U.S.A., where control has practically eliminated the danger of infection to human beings.—H. V. HUGHES.

OFFICIAL AND OTHER REPORTS

GREAT BRITAIN. (1938). **Statistical and General Report of the Army Veterinary Services, 1937-1938.** [MURRAY, C. A.] pp. 24. London: The War Office. [8vo].

In Great Britain and Northern Ireland the average strength during the year 1937–38 of horses was 6,038. The average age was 11·11 years. The general health and condition of the animals was good, the average number daily under treatment being 4·91% of the average strength. The average strength of mules was 5, their average age being 14 years. At the Aldershot school, 644 examinations were carried out in the laboratory, the majority being for the detection of helminth infestation and the diagnosis of parasitic skin diseases. An investigation was being carried out to determine whether radiological examination would reveal osteodystrophic changes in the horse in advance of the appearance of clinical symptoms.

In Egypt the average strength of horses was 585, about 6·72% of these being under treatment daily. The average strength of mules was 120, about 3·74% being under treatment daily. The average age of horses was 11·8, and of mules 13·26 years.—H. V. HUGHES.

GREAT BRITAIN. (1940). **National Institute for Research in Dairying. Annual Report 1940.** [KAY, H. D.] pp. 52. Shinfield, Reading: National Institute for Research in Dairying. [4to].

In research on MASTITIS new culture media were investigated, of which bromcresol aesculin chalk agar gave promising results. Certain media previously used appear to have given false negative results, and consequently have failed to detect cases of mild or early infection. Owing to such difficulties, a policy of eradication has given place to one of control. A new gold-sol test for mastitis was studied. Attention has also been given to the technique of hand and udder-cloth disinfection by hypochlorite: available chlorine of the solution should not fall below 200 p.p.m. for the disinfectant action to be effective. An experiment on immunization of calves against *Str. agalactiae* was begun.

Work on the hormonal control of lactation is described. The oestrogenic activity in cattle of gonadotropic hormones of equine origin was studied: small doses have been found to be effective in restoring lost ovarian rhythm.—J. E.

GREAT BRITAIN. (1941). **The Hannah Dairy Research Institute. Annual Report for the Year Ending 31st March, 1941.** [WRIGHT, N. C.] pp. 19. Kirkhill, Ayr: The Hannah Dairy Research Institute. [8vo].

The Institute's MASTITIS control scheme was extended to 65 herds during the year. The milch cows were examined at two-monthly intervals and quarter samples taken each time. Peroral sulphanilamide therapy of mastitis resulted in disinfection of the udder in 40% of the animals.

In research on milk quality tests, the methylene blue reduction test was found to agree substantially with the plate count test and, the resazurin test agreed closely with the methylene blue reduction test, but was slightly quicker in showing results.—J. E.

GREAT BRITAIN. (1939). **Alan, Duke of Northumberland Memorial Fund. Fifth Report of the Management Committee. Research Work into Sheep and Lamb Diseases, 1939.** [STEWART, W. L.] pp. 40. Newcastle upon Tyne: King's College. [8vo].

The first half of the report describes the biological and other products available to sheep farmers from the Veterinary Department, King's College, Newcastle. They include LAMB DYSENTERY antiserum and vaccine, BRAXY vaccine, "PULPY KIDNEY" disease antiserum, and copper sulphate nicotine sulphate mixture. Notes on the diseases involved and on the use and supply of the above remedies are given.

A new vaccine against CONTAGIOUS PUSTULAR DERMATITIS in sheep was developed and was on trial during the year.

Research articles appeared on PREGNANCY DISEASE

in ewes and on " moss staggers ", akin to pregnancy disease and occurring in ewes brought in from mossy fells for lambing. Recovery followed the administration of glucose, insulin, and calcium.

Methods of controlling sheep ticks were tried and an arsenic plus derris paste proved to be the best of five pastes or dips containing derris, carbolic acid, and arsenic separately or in various combinations. For protecting newborn lambs, a derris dust was more effective than a derris dip.

A continuation of research on " PINING " showed the value of supplementary feeding combined with anthelmintic treatment, the condition being evidently more a nutritional than a parasitic one, according to results of applying these treatments separately to other groups of sheep.—J. E.

CANADA. (1941). **Report of the Veterinary Director General for the Year Ended March 31, 1941.** [CAMERON, A. E.] pp. 45. Ottawa : Govt. Printer. [8vo].

The year was noteworthy by reason of a great SWINE FEVER epizootic, mainly affecting Ontario. It required the services of many veterinary inspectors for its control, so that TUBERCULOSIS eradication work had to be restricted.

CONTAGIOUS DISEASES SECTION [BARKER, N.]—There was only one outbreak of ANTHRAX and none of GLANDERS. SWINE FEVER occurred in the eastern half of the dominion. Control was by slaughter ; 35,000 pigs were killed at a cost of over $200,000 for compensation. A few cases of MANGE in cattle and horses occurred. The progress of TUBERCULOSIS eradication is shown in several tables. Over one million tuberculin tests were carried out and nearly half of all cattle in Canada were under supervision. The infection rate varied greatly, but was only 0·2% among 277,860 animals in the accredited herd plan, 1·06% among 730,000 cattle in the area testing plan, and 0·6% among over 160,000 cattle in the supervised herd plan. 8,137 cattle were slaughtered and a compensation sum of $260,500 paid. 1,319 out of 2,283 herds under supervision for the control of BOVINE BRUCELLOSIS were " clean ".

MEAT AND CANNED FOODS SECTION [MACONOCHIE, C.]—The usual abattoir traffic figures are given. Ninety-two plants were under official inspection. 1·37% of cattle and 0·23% of pigs were condemned.—J. E.

CANADA, PROVINCE OF QUEBEC. (1939). Rapport du Ministre de l'Agriculture de la Province de Quebec pour l'année finissant le 30 juin 1939. **[Report of the Minister for Agriculture, Province of Quebec, for the Year ending 30th June, 1939].** Items of veterinary interest pp. 24-27, 79, 80-81 and 94-96. Quebec : L'Imprimeur de sa Très Excellente Majesté le Roi. [8vo].

Assistance was given in connexion with the Federal scheme for the eradication of bovine TUBERCULOSIS, and there was a considerable increase in the number of requests for the vaccination of herds against BOVINE CONTAGIOUS ABORTION. In connexion with contagious MASTITIS, the system inaugurated in the preceding year, of classifying cows in the shippons according to clinical symptoms and the condition of the milk, appeared to be useful. EQUINE INFECTIOUS ANAEMIA caused more losses than in the preceding two years.

At the Institute of Parasitology, research was conducted into the PARASITIC DISEASES of sheep.

There were 53 students at the veterinary school. Investigation of EQUINE INFECTIOUS ANAEMIA was carried out in the bacteriological department.—H. V. H.

CANADA, NOVA SCOTIA. (1941). **[Report of] Animal Pathology Division [1939-40].** [HANCOCK, E. E. I.]—*Rep. Dep. Agric. Nova Scotia, 1939-40.* pp. 94–95.

During the year 237 specimens were examined at the laboratory, 217 of these were poultry and the others included foxes, mink, nutria, and pigs. Poultry diseases included COCCIDIOSIS, LEUCOSIS, and nutritional disorders ; 42,657 blood samples were tested for PULLORUM DISEASE. P.M. examinations on fur-bearing animals showed that deaths were due to food poisoning or to faults in the feeding methods. Other diseases mentioned are SWINE FEVER, BOVINE SCABIES, and breeding troubles in cattle. Eradication work on BOVINE TUBERCULOSIS is being continued.—J. A. GRIFFITHS.

CANADA, NOVA SCOTIA. (1942). **[Report of] Animal Pathology Division [1940-41].** [HANCOCK, E. E. I.]—*Rep. Dep. Agric. Nova Scotia, 1940–41.* pp. 130–132.

Tuberculin testing was carried out on 124,170 cattle and 594 reactors (0·48%) were detected. 205 specimens from poultry and other animals and 42,126 avian blood samples were examined.

An artificial insemination unit was put into operation in 1940.—J. E.

CANADA, PRINCE EDWARD ISLAND. (1940). **Annual Report of the Department of Agriculture for the Fiscal Year ending December 31st, 1939.** Items of veterinary interest pp. 15–16 and 20. Charlottetown : Patriot Publishing Company, Limited. [8vo].

PULLORUM DISEASE testing is applied generally to breeding flocks. A flock approval policy has been in effect since 1935. The birds must be in good condition, they must pass the blood test for pullorum disease, and the premises must be suitable. Dominion-approved hatcheries provide the market for the approved flocks' output of eggs. Government financial aid is given for the installation of brooder houses, and P.M. examinations of birds are made free.

The livestock and poultry census shows :– horses 28,960 ; cattle 99,600 ; sheep 46,300 ; swine 48,100 ; poultry 870,700.—J. A. GRIFFITHS.

CANADA, PRINCE EDWARD ISLAND. (1941). **Annual Report of the Department of Agriculture of the Province of Prince Edward Island for the Fiscal Year ending December 31st, 1940.** Items of veterinary interest pp. 17–18 and 74. Charlottetown : Patriot Publishing Company, Limited.

The economic value of systematic treatment for the control of sheep HELMINTHIASIS is emphasized. This is dealt with by drenching the ewes after lambing and as early in the pasture season as possible. Nicotine sulphate drenching is repeated several times at intervals of two weeks, depending on the degree of infestation. Experiments carried out on the treatment of flocks with tablets of phenothiazine proved the drug to be a highly efficient anthelmintic for sheep [no details given]. For the control of poultry diseases a free diagnosis and P.M. service is provided. A small charge is made for PULLORUM DISEASE blood agglutination tests.

The livestock in 1940 numbered 28,650 horses, 93,800 cattle, 54,600 pigs, 43,900 sheep, and 851,400 poultry.—J. A. GRIFFITHS.

AUSTRALIA. (1941). **South Australia. The Institute of Medical and Veterinary Science, Third Annual Report of the Council July 1940-June 1941.** pp. 8. Adelaide : Govt. Printer. [4to].

The veterinary section under I. W. MCDONALD carried out work on TUBERCULOSIS of swine, MINERAL

DEFICIENCY in sheep and " STAGGERS " in sheep. Many pigs slaughtered were found to be affected with tuberculosis-like lesions of the submaxillary lymph nodes : the possible connexion with *Corynebacterium* INFECTION is being investigated. Mineral supplement trials (Co, Cu, Mn, Zn, and Fe) are being conducted on sheep in an attempt to control " LAMB SICKNESS ". A disease of sheep (" STAGGERS ") characterized by degeneration of some of the spinal cord tracts, is being investigated.

The director of the institute, Professor HURST, worked on DEMYELINATING DISEASE, which can be produced by the continued administration of HCN or of sodium azide. Enzyme activity in this connexion is under study.—J. E.

NIGERIA. (1941). **Veterinary Department. Annual Report for the Year 1940.** [HENDERSON, W. W.] pp. 8. Lagos : Govt. Printer. [8vo] [1s.]

DISEASE CONTROL.—23,100 cattle and 23,100 sheep and goats were vaccinated against ANTHRAX, 534,000 cattle against BLACKLEG, 43,000 cattle against HAEMORRHAGIC SEPTICAEMIA, 402,700 against BOVINE CONTAGIOUS PLEURO-PNEUMONIA, and 439,977 by the serum-virus method and 337,580 with formalinized spleen vaccine against RINDERPEST. 23,155 cattle received a course of treatment for TRYPANOSOMIASIS by intravenous injections of tarter emetic. Helminth treatment was given to 44,694 calves, sheep, and goats. In addition to the sera and vaccines prepared at the central laboratory at Vom, rinderpest antiserum and formalinized spleen vaccine are prepared at the laboratories at Kano, Maidugari, and Yola.

RESEARCH.—No organized research work could be carried out at the central laboratory. Some cases of TUBERCULOSIS were encountered in the course of routine P.M. examinations made at Vom laboratory on zebu cattle, swine, and domestic birds.

The use of the locally made saponized ANTHRAX vaccine, prepared from a bovine strain of *Bacillus anthracis*, to immunize goats, was proved to be a cause of some mortality. In other cases a severe local reaction sometimes occurred.

A further attempt to reduce the virulence of RINDERPEST virus by passage through goats failed to attenuate the virus for use on Nigerian cattle. After 331 passages in the Kenya laboratory and a further 104 passages in Nigeria, making a total of 435 generations, it was still too virulent for the local cattle. In Nigeria, as in Kenya, cattle reacting to the goat virus were not infectious to susceptible in-contacts, reactions were shorter, and there was no ulcerative stomatitis, even in animals which died. No results of value were obtained by the use of virus incorporated in egg-yolk alone or with cod liver oil or whale oil as a vaccine.

There was failure in attempts to transmit BOVINE CONTAGIOUS PLEURO-PNEUMONIA virus to cattle, sheep, and goats by the use of a large insufflator on animals in a confined space. Funds were provided in 1940 by the Colonial Development Fund for the appointment of a research officer to carry out investigations on CAPRINE CONTAGIOUS PLEURO-PNEUMONIA. An officer was appointed to the post in May and has commenced the preliminary studies of local conditions.

An undiagnosed condition in horses in which there is invariably a chronic NEPHRITIS is mentioned as occurring in one locality.

Three plants which were found to cause acute inflammatory changes in the alimentary canal were *Paullinia pinnata* (Family Sapindaceae), *Clematis hirsuta* (Family Ranunculaceae), and *Poinsettia pulcherimma* (Euphorbiaceae).

ANIMAL HUSBANDRY.—A castration campaign to preserve the purity of the Red Sokoto and the Brown Kano breeds of goats has been continued on a large scale. Scrub bulls are also castrated.

Good quality dairy produce has been in greater demand since the outbreak of the war, to supply European requirements. This is being met by an increased output of butter, clarified butter fat, and milk under the department's supervision. In addition to the market for butter consumed locally, there is commercial production of clarified butter fat from native-made butter. This amounted to 2,400 tons most of which went to Great Britain. Centres have now been established for the manufacture of high-grade clarified butter from milk brought in by native cattle owners.

The very large trade in animals for slaughter purposes continues to flourish ; nearly half a million cattle are slaughtered annually in Nigeria apart from some 5–6 million goats and sheep. Over 16,500,000 lb. of hides and skins were exported. The livestock population in 1940 was 2,707,000 cattle, 676,000 horses, 1,767,000 sheep, 4,744,000 goats, and 200,500 pigs.

—J. A. GRIFFITHS.

GOLD COAST. (1940). **Report on the Department of Animal Health for the Financial Year 1399-40.** [STEWART, J. L.] pp. 7. Accra : Govt. Print. Dep. (Publications Branch). [fcp] [1s.]

As well as giving figures on the year's work, the report surveys the animal industry situation in comparison with that of ten years ago, a time when RINDERPEST raged, so that there were only 100,000 cattle in the colony. The main work of the department in the last decade has been rinderpest immunization, which is now applied to every bovine animal at two years of age (24,000 during the year). Every adult bovine is now immune. BOVINE CONTAGIOUS PLEURO-PNEUMONIA is next in importance and is checked by immunization, 110,000 animals being so treated during the year. TRYPANOSOMIASIS is a serious cause of ill health, but mortality directly due to trypanosomes is only important in horses. Planned river-bank clearing to reduce tsetse areas is carried out. PIROPLASMOSIS, ANAPLASMOSIS and THEILERIASIS are enzootic diseases which cause " stunting " of cattle.

The Pong-Tamale laboratory prepared 3,447 litres of anti-rinderpest serum, 299 litres of anti-rinderpest vaccine, and 110,000 doses of bovine contagious pleuro-pneumonia vaccine. Fowl-pox vaccine, fowl cholera serum, and 2,130 doses of rabies vaccine for use on dogs in towns, were also prepared.

The position with regard to breeding and improvement of cattle is described. The colony is not yet self-supporting in meat, but great progress has been made : the cattle population had risen to about 250,000 by 1940.—J. E.

NYASALAND PROTECTORATE. (1941). **Report of the Veterinary Department for the Year ended 31st December, 1940.** [DE MEZA, J.] pp. 4. Zomba : Govt. Printer. [fcp] [1s.]

Details are given of the various means used to improve the native methods of livestock husbandry and to foster animal industry. Military requirements are aiding the movement by providing a ready market for milk, butter, ghee, and slaughter animals in the cattle areas. European-owned herds are mainly in the Southern Province and are kept for dairy purposes. Very few animals are used for transport purposes. Only a few pure-bred animals have been imported. Except for a few large dairy concerns, Europeans show little

interest in livestock. The policy of providing dipping facilities in the enzootic EAST COAST FEVER areas continues to prove beneficial; there is a great increase in the numbers of cattle where this system is carried out.

Except for TRYPANOSOMIASIS, the disease situation has been satisfactory. Only three cases of TUBERCULOSIS were diagnosed in the abattoirs and these were from one herd in Ncheu in which no more cases were found. Three cases of ANTHRAX were diagnosed in the Northern Province.

Trypanosomiasis is enzootic in South Nyasa and Lower Shire, but outbreaks occur in other areas. The disease is controlled by the suspension of movement of the infected herds and the treatment of individual animals with tartar emetic or antimosan. EAST COAST FEVER is controlled by the application of seven-day dipping throughout the enzootic areas and the enforcement of three-day dipping where an outbreak occurs.

Only six cases of RABIES were reported; this is a decrease. 36,000 cattle were given three doses each of vaccine to protect them from a threatened spread of RINDERPEST from the neighbouring Tanganyika Territory. There were three cases of HORSE SICKNESS. Suspected cases of HEARTWATER in cattle were reported from Dedza and Karonga.

Specific OPHTHALMIA in cattle occurs all over the country, but is quickly controlled by iodine treatment. Other diseases mentioned are CANINE PIROPLASMOSIS and FOWL TYPHOID. Intestinal helminths in calves are combated by drenching with the standard remedies.

1,330 specimens were examined in the laboratory.
—J. A. GRIFFITHS.

MAURITIUS. (1941). **[Report of] Veterinary Division.** [LIONNET, F. E.]—*Rep. Dep. Agric. Mauritius, 1940.* pp. 5 and 23–24.

DISEASE CONTROL.—TUBERCULOSIS is a major problem. There were 456 positive reactors in 1,290 cattle tested (over 35%). The use of BCG vaccine in calves has been a failure. Twenty-two cows so treated as calves reacted to tuberculin and P.M. all showed tuberculosis lesions, three being cases of generalized TB. One herd which showed 14% infected animals when tested in the previous year gave 85% reactors on re-test. It is thought the result may have been due to some extent to the use of a more potent tuberculin. The use of antistreptococcal vaccine is thought to have improved the position in regard to abortion in the Government dairy herds, believed to be due to streptococci [see *V. B.* **11.** 817]. Only 13 positive cases of TRYPANOSOMIASIS were detected in 13,613 blood smears examined; of these seven bovines out of 12,953 examined and four equines out of 652 were infected with *T. evansi* and two bovines with *T. vivax*; two sheep and five dogs were negative. *T. evansi* infection in equines was treated with naganol and in bovines with soamin. The *T. vivax* infection in bovines was treated with tartar emetic. The agricultural census shows 29,077 bovines, 27,077 goats, 1,909 sheep, and 3,165 pigs. Importations were 2,900 cattle for beef.—J. A. GRIFFITHS.

HONG KONG. (1941). **Report of the Colonial Veterinary Surgeon, Hong Kong, for 1st January, 1940 to 31st March, 1941.** [MACKENZIE, W. J. E.] pp. 2. [fcp].

The state of animal health in the colony remained very satisfactory and the position in regard to CONTAGIOUS ABORTION and TUBERCULOSIS continued to improve. Only a few sporadic cases of ANTHRAX occurred in the animals of the colony. There was only one imported case of RABIES, whilst a small outbreak of RINDERPEST occurred in a batch of recently imported non-immunized cows.

Amongst the animals quarantined on importation for slaughter (the figures for which, except in the case of sheep and goats, show a considerable decrease on the previous year's figures), there were more cases of ANTHRAX than of any other disease in the cattle; SWINE ERYSIPELAS and SWINE FEVER were the most frequent diseases in such pigs. Only four cases of disease were detected amongst the 28,034 sheep imported for slaughter.—H. V. HUGHES.

JAMAICA. (1941). **Report of Senior Veterinary Officer [1940-41].** [LOCKETT, S.]—*Rep. Dep. Agric., Jamaica, 1940–41.* p. 6.

The only notifiable disease to occur was SWINE FEVER. A tuberculin test survey on 2,556 cattle in 29 dairy herds revealed an infection rate of 0·27%. Vaccination was undertaken against BLACKLEG. Some outbreaks of PIROPLASMOSIS and ANAPLASMOSIS are recorded. NECROBACILLOSIS of the muzzle of goats was prevalent in certain areas and HAEMATURIA VESICALIS of cattle continued to appear in two localities.—J. E.

U.S.A. (1940). **New York State Department of Health. Annual Report of the Division of Laboratories and Research, 1940.** pp. 97. [Items of veterinary interest pp. 8, 9–10, 14–16, 39 and 91]. Albany: State Department of Health. [8vo].

A study was made of bacteria from abscesses and lesions in rabbits [history of rabbits not related]. They resembled *Pasteurella lepiseptica* in many respects but had no bipolar staining characteristic. Their exact identity was not determined. A great increase occurred in the number of dogs' heads sent for RABIES diagnosis from New York State; Negri bodies were observed in 73 out of about 580. Spectrophotometric methods were applied in a study of purified fractions of bacterial toxins with the object of finding whether absorption spectra could be used as an indicator of toxin purity, and fluorescence spectrograms were made with a culture filtrate of *Corynebacterium ovis*. The original should be consulted for the results obtained. Some experiments were made on sulphanilamide derivatives, results having been reported in the scientific press.—J. E.

U.S.A. CALIFORNIA. (1940). **Los Angeles County Live Stock Department. Review Covering Recent Field and Laboratory Work in Animal Disease Control, 1939-1940.** [HURT, L. M.] pp. 54. [4to] [Mimeographed].

U.S.A. CALIFORNIA. (1941). **Los Angeles County Live Stock Department, Los Angeles, California. Annual Report for the Fiscal Year Ending June 30, 1941.** [HURT, L. M.] pp. 70. Los Angeles, Calif. [4to] [Mimeographed].

These are excellently compiled accounts of the livestock industry in Los Angeles county, California, with great detail on the incidence and control of diseases.
—J. E.

DENMARK. (1942). Danmark. Uddrag af Veterinaerdirektoratets Beretning for Aaret 1940. **[Extract of the Report of the Veterinary Directorate for 1940, Denmark].**—*Skand. VetTidskr.* **32.** 134–142.

[The report for 1939 has not been received: for that for 1938, see *V. B.* **10.** 644. The 1940 report appears to have been extracted in full or nearly so in the *Skand. VetTidskr.*].

The great outbreak of FOOT AND MOUTH DISEASE which began in 1938 finally waned in the middle of 1940, but after a pause, small secondary outbreaks occurred and persisted into the winter of 1940–41. Swine were involved to a greater extent than previously, especially

in the swine products export area around Aalborg. The disease did not spread in cattle in that area.

To cope with the secondary outbreaks in cattle in Denmark as a whole, vaccination was applied on a large scale, *viz*, to 800,000 cattle in 39,300 herds, the majority receiving bivalent (A + O virus) vaccine. Figures on vaccination applied during the whole outbreak since November, 1938 are given. Only 0·7% of vaccinated herds became infected later and half of these were infected within six days of inoculation, *i.e.* before immunity had had time to develop.

There were 12 outbreaks of malignant FOOT ROT and ten flocks were slaughtered, kr. 2,460 being paid in compensation.

In the campaign against BOVINE TUBERCULOSIS, free tuberculin testing was carried out in 27,114 herds, 22,000 being tested for the first time : 20 of these were clean. [No reactor percentage figures are given.] Tuberculin was supplied free to 120 dairy societies embracing 13,434 herds with 170,267 animals. 3·2% of the herds and 1% of all the animals reacted. Tuberculin tests on fowls revealed a 10% reactor rate in 31 of 48 flocks.

Figures are given for BRUCELLOSIS diagnostic work, but the results are not clearly shown.

The following numbers of outbreaks and affected animals (in brackets) refer to other important diseases :– strangles 3,043 (8,137), anthrax 17 (22), swine erysipelas 706 (1,872), swine plague 2,050 (13,316), calf diphtheria 245 (1,240), blackleg 16 (18), bovine ringworm 1,314 (6,560), equine pustular stomatitis 63 (624), cow pox 347 (3,476), dog distemper — (996), equine mange 10 (51), and bovine malignant catarrh 20 (31). Figures are also given for several other diseases.

Figures concerning poultry inspection and disease show that the industry was seriously depressed.

At July 1940 there were in Denmark 574,695 horses, 3,279,314 cattle, and 3,269,398 pigs ; 26,693 horses, 328,178 cattle, and 748,415 pigs were exported.

—J. E.

BOOK REVIEWS

BRAGA, A. (1941). Soros, vacinas, alérgenos e imunígenos. Tomo II. **[Sera, Vaccines, Allergens and Immunogens (for Veterinary Use). Volume II].** pp. 242. Numerous figs. Rio de Janeiro : Serviço de Informação Agricola. [8vo] [French summary at end of each chapter].

In this volume the author deals with anti-streptococcal serum, tetanus toxoid, tuberculin, concentration of immune sera, virus culture, and the filtration of biological products used in veterinary medicine.

The aim of the book appears to be, not so much the description of new methods, as a detailed review of accepted methods. As a source of information to laboratory workers and as a contribution to the standardization of biological products prepared in Brazil, the book should prove of considerable value.

Throughout, the author has described his own methods of work and stated his reasons for his modifications of accepted methods. He appears to be satisfied with the effectiveness of anti-streptococcal serum as applied in the treatment of strangles, although he admits that many authorities deny that such serum is effective. In the titration of anti-streptococcal serum he describes the use of complement-fixation, agglutination, and flocculation tests.

In the chapters on tetanus toxoid and tuberculin, known methods of preparation and estimation of these products are described in great detail and the chapter on virus culture (*in vitro* in tissue culture, and in chick embryos) is very explicit and well illustrated. The same standard has been maintained in the chapters on concentration of immune sera and filtration methods.

A useful table of dilutions for the estimation of sera and toxins is included.—MILLER WATSON.

SWEANY, H. C. [M.D., Medical Director of Research, Municipal Tuberculosis Sanatarium, Chicago, and Research Associate, Department of Physiology, University of Chicago]. (1941). **Age Morphology of Primary Tubercles.**—pp. xxii + 265. 73 plates. Springfield, Ill., & Baltimore, Md. : Charles C. Thomas Ltd. [8vo] [27s. 6d.].

As the result of a long acquaintance with tuberculosis in U.S. sanatoria, the author has approached the genesis of human TB. from a new angle. He advances a concept in regard to the evolution of the disease which throws a new light on the significance of the Ghon primary focus and the secondary manifestations in the tuberculous patient, and he gives minute details of a number of cases in order to support his claims with factual data. His main premise is that encapsulation and restoration of injured tissues follow a definite time curve bearing a relation to the age at which the infection was acquired. The salient histological changes occurring in lesions of 3–12 mm. in size possess very significant ageing characteristics which the author has attempted to correlate with X-ray findings. The results are said to reveal a regular trend in the retrogression of primary tubercles.

The book, which is intended for the student of human TB., is excellently produced and is provided with 73 plates comprising a series of roentgenograms with photomicrographs of lesions from the same subjects.—R. E. GLOVER.

HARTMAN, R. J. (1941). **Colloid Chemistry.** pp. xxviii + 556. 184 figs. London : Sir Isaac Pitman & Sons, Ltd. [8vo] [21s.]

In this book the author has attempted to present the fundamentals of colloid chemistry in such a manner that they can be understood not only by chemists and physicists but also by biologists with only a moderate background of chemistry. The fact that readers whose main interest is in medical or veterinary science may find some portions of the theoretical discussion somewhat difficult to follow will not prevent them from appreciating the general principles and their more important applications, and absorbing much useful concrete information.

Part I deals with the general characteristics, fundamental theories, applications, and uses of surface chemistry ; part II discusses the behaviour and some applications of lyophobic colloidal systems, and part III is devoted to a similar study of lyophilic systems. In view of the great advances made in the application of knowledge of the colloidal state to the explanation of biological phenomena, part IV deals with biocolloids and some colloidal aspects of living behaviour. The ground covered in this portion embraces saccharocolloids, proteins, lipins, cookery products, dairy produce, the nature of enzymes, distribution of substances in organisms as affected by their biocolloids, cell membrane permeability, colloidal factors influencing growth and movement of organisms, some colloidal aspects of blood and nervous system, and some colloidal medicines.

There is a good index and list of references.

—H. H. GREEN.

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